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WHITE PINE BLISTER RUST CONTROL
IN THE
NORTHWESTERN REGION

January 1 to December 31, 1949

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United States Department of Agriculture
Agricultural Research Administration
Bureau of Entomology and Plant Quarantine
Division of Plant Disease Control
Blister Rust Control
618 Realty Building
Spokane, Washington

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WHITE PINE BLISTER RUST CONTROL IN THE NORTHWESTERN REGION

Calendar Year 1949

Herman E. Swanson, Regional Leader

Public and private agencies have been fighting blister rust on selected white pine areas in the Northwest for 25 years. In only eight of these years, 1933-1940, under the emergency work relief programs did the control work approach actual requirements. In spite of the handicaps of extreme fluctuations in size of the programs and the inadequacy of the small program of recent years, the control program to date has protected substantial white pine values. Conservative estimates based on field surveys indicate that young white pine stands which will produce at least 5 billion board feet at maturity have been completely protected from blister rust. This stumpage at \$13 per MBF will be worth \$65,000,000. In addition, a potential 7.2 billion board feet of white pine exists in partially protected stands which should have a value of \$94,000,000 at maturity if blister rust control is completed. In accomplishing this, \$17,000,000 (including emergency relief work programs) have been expended for ribes eradication in the control of white pine blister rust in the Northwest.

Blister rust infection occurring before control is established has tended to discredit the effectiveness of the control program. An average of 28 percent of the potential white pine stumpage became infected on the high priority areas before ribes eradication and the loss will be greater on those areas where control work is not yet completed. It is obvious that losses occurring before control is established make the per MBF cost of protecting the healthy residual trees that much greater.

Improved management of white pine lands and new developments in ribes eradication methods are reducing costs of blister rust control. Attention is being given in management to grow all white pine possible in the units protected from blister rust. The Forest Service is definitely committed to this policy. State and private foresters are giving attention to forest practices which will lessen the blister rust control job and produce the maximum of white pine on lands where control work is being performed. Developments in chemicals and methods of applying them in ribes eradication have already reduced costs in the last two years and further important benefits from this field are to be expected. Other new practices in ribes eradication have recently been employed to great advantage and their use is being expanded as experience and application permit. Important in the long term picture is a project for the propagation of white pine resistant to blister rust which was started in the Inland Empire in 1949. Brief statements of this work and other highlights of the 1949 season are presented below.

An adequate and a stable blister rust program is needed for both public and private lands best suited for the growing of white pine and the owner of private timber lands needs assurance of sustained federal assistance if this important natural resource is to be maintained in amounts commensurate to its value to the region and the nation.

Progress in 1949

The agencies directly engaged in ribes eradication for the control of white pine blister rust in the Northwestern Region were the same as in previous years. The field programs were as follows:

	<u>Number Camps</u>	<u>Number Workers</u>
Bureau of Entomology and Plant Quarantine (State of Idaho, Clearwater, Potlatch and Priest Lake Timber Protective Associations as cooperators)	7	243
U. S. Forest Service	27	1,073
National Park Service	<u>3</u>	<u>76</u>
Total	37	1,392

A total of 53,000 acres was worked in 1949, representing 400 acres more than were worked in 1948. Also, 3,000 less effective man-days were used in 1949. This increased production in 1949 was due to improved work methods and in part to better labor. Men of college age were available in sufficient numbers and they proved to be more stable and qualified than the youthful labor which has comprised the bulk of the force since 1941.

Rework to complete protection on the high priority areas of reproduction and pole size white pine is adding acreages to the maintenance classification each year. Many areas of reproduction apparently in a satisfactory condition are withheld from this classification until subsequent inspections have shown that no new rust infection is appearing on white pine. In 1949, 19,000 acres were placed on maintenance while 6,000 acres of previously protected area reverted to an unworked status as a result of logging operations.

48-Hour Work Week

The 48-hour work week as started in 1948, again was highly advantageous to the project. By reducing the ratio of fixed and other overhead charges to wages paid for ribes eradication and by eliminating much labor turnover, the longer work week lowers effective man-day costs by 16 to 20 percent. Fire duty cut heavily into the working season and without the Saturday work as provided in the 48-hour week, the blister rust control season would have been critically shortened. With a short operating season and labor upon which the project must depend available for less than 3 months, a 48-hour week is a necessity.

Spread of the Rust

Scouting in 1949 for the spread of blister rust in the Northwestern Region found an extension of the known limits of rust on both ribes and white pine. Infected white pine, Pinus flexilis or P. albicaulis, were found for the first time in Park, Madison, and Lewis and Clark Counties of Montana. The most significant of these is the one in Park County, 2 miles north of Yellowstone

National Park. Infected ribes were found for the first time in Park and Fremont Counties of Wyoming and Lemhi County of Idaho. The infection in Fremont County is an extension of 100 miles east and 50 miles south of previously located infection near Jackson, Wyoming. The new location is 12 miles west of Lander, Wyoming. The ribes infection in Park County is an easterly extension of 38 miles and is 12 miles east of Yellowstone National Park.

Ribes Eradication by Chemical Methods

Chemical methods for ribes eradication were expanded in 1949 and results point toward increased use as techniques and equipment are improved. Lower prices for 2,4,5-T would also help. A summary of chemical work in 1949 is as follows: 2,200 acres treated, 3,900 man-days, and 71,000 gallons of chemical used. Ribes populations on treated areas ranged from 200 to 1,000 per acre. The work was done entirely with 2,4,5-T, except for 23 acres treated with Ammate. Ammate and 2,4,5-T were used to advantage by hand crews to treat decapitated crowns of ribes difficult to pull.

The knapsack and trombone pump, the Hi-Fog gun, and the power sprayer have been the principal equipment used in chemical ribes eradication methods. In 1949, a turbine blower mounted on a turntable and trailer was tried. These trials indicate that the blower may have extensive use in cutover areas, since survey records show that about 90 percent of the ribes on such ground occur within a chain of the roads and cat trails. Ribes and brush were also sprayed with 2,4,5-T from a helicopter. This method may prove feasible, but additional experimentation is necessary before its practicality is determined.

Contracting Ribes Eradication

<u>Year</u>	<u>By Contract</u>	<u>By Camp Labor</u>	<u>Total</u>	<u>Percentage Contracted</u>	<u>Average Bid Price Per Acre</u>
	Acres	Acres	Acres	Percent	Dollars
1947	180	81,020	81,200	0.2	7.24
1948	830	51,770	52,600	1.6	13.20
1949	3,040	49,960	53,000	5.7	13.43

In 1949, ribes eradication by contract advanced to a practical basis with 50 contracts awarded and work successfully completed on 3,040 acres. Extensions to June 30, 1950, were granted on other contracts where awards were made late in the season. Two national forests and one cooperative project of the Bureau awarded 42 of the contracts. It will take time for the other six operations to attract sufficient responsible bidders to equal the progress made by the other three operations. The acceptance of contracting by blister rust control supervisors is practically unanimous, and all feel that it has a definite place in the program. Difficulties have been experienced on forests which are starting the work, but once a number of interested contractors accumulate in a territory, these problems seem to disappear. Areas with more difficult working conditions are being put up for contract work than in 1947 which accounts for the higher average bid prices. Ribes eradication by contract is being accomplished

at about a 25 percent lower cost than by labor under force account. As competition among bidders increases, contract prices have come down.

Resistant White Pines

A project was started to establish arboretums of western white pine resistant to blister rust. The arboretums are to be located where the trees will be continually exposed to blister rust infection and away from pollen from nonresistant white pine. The arboretums will provide for the natural elimination of nonresistant trees and eventually become possible seed sources for the production of resistant strains. Fourteen western white pines, very resistant to blister rust since each is growing in a heavy blister rust infection center and has not become infected, have been located, carefully examined, and described. Scionwood from eight of these trees has been grafted on 5-year-old nursery transplants provided by the Forest Service. A total of about 150 grafts have been attempted. Grafts of the veneer, cleft, whip, and bud types are included. Experimental work on rooting western white pine cuttings is proceeding with 6,500 cuttings now undergoing screening trials to determine the best methods for rooting the cuttings. If western white pine cuttings can be rooted, materials from the 14 resistant trees will be propagated by this method as well as by grafting. Grafting and cutting propagation is being continued through the winter. Intraspecific pollinations among the resistant trees will be made next season. A $2\frac{1}{2}$ -acre arboretum site has been prepared in Randolph Creek, not far distant from the Forest Service tree nursery at Haugan, Montana, and will be used for planting such grafted or other resistant tree material propagated from cuttings, as may be ready in the 1950 season.

The Office of Blister Rust Control is heading up work on this project. Cooperation and assistance of the Forest Service is being secured in several phases of the work. The Division of Forest Pathology, already actively cooperating with various agencies in the propagation and testing of rust resistant eastern white pine, has requested cuttings from western white pines for use in special propagating tests. They may also be able to provide some manpower during the pollinating season.

Publications

"Development of a Blister Rust Control Policy for the National Forests in the Inland Empire" by Donald N. Matthews and S. Blair Hutchison. This comprehensive report following a 2-year study of the blister rust problem in the Inland Empire, was issued by the Forest Service in Region One in December 1948 and distributed in 1949. It points out the importance of white pine to the Inland Empire and the justification for its protection from blister rust.

SUMMARY OF PROGRESS

A summary of blister rust control activities in the Northwestern Region is presented in the following tables:

TABLE 1

SUMMARY OF RIBES ERADICATION BY STATES AND OPERATING AGENCIES - 1949

State	Operating Agency	First Working		Second Working		Other Workings		All Workings		Per Acre		Number of Seasonal Camps	Total Employees
		Acres	Destroyed Ribes	Man-Days	Acres	Destroyed Ribes	Man-Days	Acres	Destroyed Ribes	Man-Days	Ribes		
Idaho	BEFq	690	42,000	490	5,280	169,000	4,930	3,710	70,000	2,300	9,680	281,000	7,720
	FS	4,170	513,000	4,710	10,010	269,000	7,340	20,730	335,000	14,720	34,970	1,117,000	26,770
	Subtotal	4,860	555,000	5,200	15,290	438,000	12,270	24,500	405,000	17,020	44,650	1,398,000	34,490
Montana	FS	2,670	401,000	4,680	1,740	56,000	1,620	90	6,000	130	4,500	463,000	6,430
	NFS	370	137,000	845	150	25,000	224	200	20,000	272	720	182,000	1,341
	Subtotal	3,040	538,000	5,525	1,890	81,000	1,844	290	26,000	402	5,220	645,000	7,771
Washington	FS	80	50,000	300	90	7,000	40	470	95,000	710	640	152,000	1,050
	NFS				360	20,000	328	180	25,000	244	540	45,000	572
	Subtotal	80	50,000	300	450	27,000	368	650	120,000	954	1,180	197,000	1,622
Wyoming	NFS	1,820	405,000	1,900	80	1,000	39		70,000	2,300	9,680	406,000	1,939
	BEFq	690	42,000	490	5,280	169,000	4,930	3,710	70,000	2,300	9,680	281,000	7,720
	Subtotal	2,510	447,000	2,390	13,280	338,000	9,860	7,420	140,000	4,600	19,360	687,000	27,100
All States	FS	6,920	964,000	9,690	11,840	332,000	9,000	21,350	436,000	15,560	40,110	1,732,000	34,250
	NFS	2,190	542,000	2,745	590	46,000	591	380	45,000	516	3,160	635,000	3,852
	Total	9,110	1,506,000	12,435	12,430	378,000	9,591	25,440	551,000	18,376	52,950	2,367,000	48,102

TABLE 2

ACREAGE WORKED BY LAND OWNERSHIP - 1949

Land Ownership	First Working		Second Working		Other Workings		All Workings	
	Acres	Destroyed Ribes	Acres	Destroyed Ribes	Acres	Destroyed Ribes	Acres	Destroyed Ribes
National Forest Region 1	6,070	11,860	16,860	34,790				
National Park	2,190	590	380	3,160				
Public Domain			210	210				
State and Private	1,540	5,260	7,990	14,790				
Total	9,800	17,710	25,440	52,950				

TABLE 3

SUMMARY OF EXPENDITURES - FEDERAL AND COOPERATIVE - 1949

State	Federal Funds				Cooperative Funds			Expenditures Ribes Eradication
	Entomology and Plant Quarantine W-a.14	Forest Service	Park Service	Total Federal Funds	Direct Aid	Indirect Aid	Total (Direct and Indirect Aid)	
Idaho	\$95,700	\$99,452	\$726,066	\$921,218	\$36,020	\$2,000	\$38,020	\$959,238
Mont.	16,390		178,915	\$30,506	225,801	1,000	1,000	226,801
Wash.	16,113		30,765	11,901	58,779	1,000	1,000	59,779
Colo.	1,800				1,800	200	200	2,000
Wyo.	4,734		33,828	38,562				38,562
Total	\$134,727	\$99,452	\$935,745	\$1,246,160	\$36,020	\$4,200	\$40,220	\$1,286,380

TABLE A

STATUS OF RIBES ERADICATION BY STATES - ALL OWNERSHIPS, DECEMBER 31, 1949
Accumulative Series - Net

State	Total Acres		First Working		Second Working		Other Workings		On Maintenance		Remaining Work	
	White Pine	Control Area (Wh.P. & Prot. Zone)	Acres	Percent	Acres	Percent	Acres	Percent	Acres	Percent	Unworked Acres	Requiring Rework Acres
Idaho	1,928,000	2,255,000	1,509,000	67	449,000		158,000		491,000	22	746,000	1,018,000
Montana	205,140	213,140	145,140	68	21,619		8,569		80,846	38	68,000	64,294
Washington	142,100	153,100	117,100	76	45,900		24,880		34,000	22	36,000	83,100
Wyoming	9,600	9,600	9,200	96	1,558		152		5,580	58	400	3,620
Colorado	6,000	6,000									6,000	
Total	2,290,840	2,636,840	1,780,440	68	518,077		191,601		611,426	23	856,400	1,169,014

TABLE B

SUMMARY OF STATUS OF RIBES ERADICATION BY LAND OWNERSHIP, DECEMBER 31, 1949
Accumulative Series - Net

Land Ownership	Total Acres		First Working		Second Working		Other Workings		On Maintenance		Remaining Work	
	White Pine	Control Area (Wh.P. & Prot. Zone)	Acres	Percent	Acres	Percent	Acres	Percent	Acres	Percent	Unworked Acres	Requiring Rework Acres
National Forests R-1	1,195,000	1,405,000	1,070,000	76	307,000		100,000		354,000	25	335,000	716,000
National Parks	24,840	24,840	18,440	74	9,077		12,601		11,426	47	6,400	7,014
Public Domain	21,000	30,000	17,000	57	6,000		3,000		7,000	23	13,000	10,000
Subtotal - Interior	45,840	54,840	35,440	65	15,077		15,601		18,426	34	19,400	17,014
State and Private Lands	1,050,000	1,177,000	675,000	57	196,000		76,000		239,000	20	502,000	436,000
Total	2,290,840	2,636,840	1,780,440	68	518,077		191,601		611,426	23	856,400	1,169,014

COOPERATIVE BLISTER RUST CONTROL ON STATE AND PRIVATE LANDS

Herman E. Swanson, Regional Leader

Calendar Year 1949

The cooperative blister rust control program on state and private lands in the State of Idaho was administered by the Bureau of Entomology and Plant Quarantine in cooperation with the State of Idaho and the Clearwater, Potlatch, and Priest Lake Timber Protective Associations. The federal, state and private funds allotted to this work in recent years have made it possible to reach but very little of the good state and private white pine lands which require immediate control work to prevent further damage to the stands.

Through field conferences and discussions with officials of the State of Idaho and the Timber Protective Associations, attention is being directed to the serious losses occurring in the stands and also to the value of the accomplishments of control even under a small program. For example, a 1949 survey on a 1,100-acre tract of intermingled state and private lands near Pierce, Idaho, supporting white pine 50 years old showed 42 percent blister rust damage before protection from blister rust was completed. With an original potential stumpage of 34 million board feet at 120 years, the yield will be only 20 million after subtracting blister rust losses. Charging all blister rust costs on the area to the 20 million board feet which has been saved, the average cost is \$0.50 per MBF which includes \$0.44 for initial working and rework and \$0.06 for future maintenance. Ribes eradication in stands of this age is less costly than the work in younger classes.

All efforts possible under the present program are being made to complete protection in the units containing the best pole size and reproduction stands. Within these units also where mature stands are present, operators are encouraged to follow cutting practices which will minimize the ribes problem and insure an abundant regeneration of white pine seedlings. This concentration of growing and protecting white pine will produce substantial timber volumes even under a small blister rust control program.

Chemical eradication of ribes on cutover lands in state and private ownership looks very promising. Good results have already been obtained, but new equipment, especially the turbine blower, may revolutionize the method of attacking cutover areas where logging roads and cat trails are present.

Descriptions of the cooperative work on the Clearwater, Potlatch, and Priest Lake Timber Protective Associations are to be found in the Clearwater, St. Joe, and Kaniksu operation reports. A summary of the 1949 cooperative program follows.

1. Allotments

<u>Agency</u>	<u>Fiscal Year 1949</u>	<u>Fiscal Year 1950*</u>
Federal (BEPQ)	\$111,000	\$107,350
State of Idaho	20,000	25,000
Clearwater T.P.A.	6,531	6,530
Potlatch T.P.A.	5,430	5,430
Priest Lake T.P.A.	<u>4,055</u>	<u>4,055</u>
Total	\$147,016	\$148,365

*Approximate

2. Field Program and Expenditures - Calendar Year 1949

<u>Operation</u>	<u>Number Camps</u>	<u>Number Workers</u>	<u>State and Private Funds</u>	<u>Federal Funds</u>	<u>Total Funds</u>
Clearwater	3	101	\$14,097	\$43,022	\$ 57,119
St. Joe (Potlatch)	3	115	11,702	44,473	56,175
Kaniksu (Priest Lake)	<u>1</u>	<u>27</u>	<u>10,221</u>	<u>11,957</u>	<u>22,178</u>
Total	7	243	\$36,020	\$99,452	\$135,472

Notes: (1) Kaniksu (Priest Lake) includes \$4,586 of contract work.

(2) Division of State and Private funds for 1949.

State of Idaho \$20,003, T.P.A. \$16,017; for period 1928-1948, State of Idaho \$263,499, T.P.A. \$215,223, Total \$478,722.

3. Cooperative Ribes Eradication in Idaho, 1949

<u>Operation</u>	<u>Initial Work Acres</u>	<u>Rework Acres</u>	<u>Total Worked Acres</u>	<u>Man- Days</u>	<u>Ribes</u>	<u>Per Acre Man- Days</u>	<u>Ribes</u>
Clearwater	690	2,110	2,800	2,740	187,000	.98	67
St. Joe	-	5,390	5,390	3,870	63,000	.72	12
Kaniksu	-	<u>1,490</u>	<u>1,490</u>	<u>1,110</u>	<u>31,000</u>	<u>.74</u>	<u>21</u>
Total	690	8,990	9,680	7,720	281,000	.80	29

4. State and Private Lands Worked, 1949

<u>State</u>	<u>First Working Acres</u>	<u>Second Working Acres</u>	<u>Third Working Acres</u>	<u>Total Worked Acres</u>
Idaho	1,540	5,260	7,840	14,640
Washington	-	-	<u>150</u>	<u>150</u>
Total	1,540	5,260	7,990	14,790

5. Net Progress on State and Private Lands, 1923-1949

<u>State</u>	<u>First Working Acres</u>	<u>Second Working Acres</u>	<u>Third Working Acres</u>	<u>Maintenance Acres</u>	<u>Unworked Acres</u>	<u>Control Area Total Acres</u>
Idaho	632,000	181,000	69,000	218,000	482,000	1,114,000
Montana	20,000	3,000	2,000	14,000	15,000	35,000
Washington	<u>23,000</u>	<u>12,000</u>	<u>5,000</u>	<u>7,000</u>	<u>5,000</u>	<u>28,000</u>
Total	675,000	196,000	76,000	239,000	502,000	1,177,000

REGIONAL SUMMARY FOR NATIONAL FOREST OPERATIONS

Calendar Year 1949

G. M. DeJarnette, Forester in Charge
Blister Rust Control, U.S.F.S., Region One

The individual operations' reports prepared jointly by the Bureau and Forest Service men in charge of the six operations involving National Forest units include the pertinent details concerning them. The discussion which follows summarizes the Regional situation briefly with respect to some of the major parts of the action program and points out the direction we are taking in shaping up the program for National Forest lands.

In general, the past season was one of the best in the history of the project with respect to accomplishment. On the whole, the quality of labor was better than at any time since prewar days. The average age of men recruited was higher, the men worked better, and turnover was less. A general tightening of supervision all along the line resulted in better weeding of the gold bricks and the unfit either by quitting or discharge.

The drive to reduce both over-all and man-day costs is continuing. Progress was made in contracting, chemical methods, and in the application of the one-man method. The latter offers the most promising means for improving production and at the same time improving the quality of hand eradication work with hired crews of any innovation of recent times. The Clearwater adaptation of individual acre block assignments and a rating scheme based on both amount and quality of work per man, per crew, and per camp is considered an excellent application of the scheme. It is being seriously considered for application on a Region-wide basis.

The six-day week has resulted in much greater effectiveness of all crews and is a very definite forward step in cost reduction.

Controlled burning to reduce eradication costs was done on two forests. On the Kaniksu, a heavy concentration of ribes in dense brush and heavy fuels at the head of Kalispell Creek was partially burned out. Follow-up to complete the burn is planned. The eventual cost of eradication is expected to be reduced by at least 75 percent. Following the burn, broadcast spraying of seedlings will be a matter of 1 or 2 man-days per acre versus 6 to 10 under conditions as they were - about 600 acres are involved. An area of 200 acres of extremely heavy ribes was burned out on Preston Creek on the St. Joe. A very good burn was made. Cleanup by spraying will be relatively easy. In both cases, the areas burned contained very little reproduction and the heavy ribes concentrations threatened valuable stands of planted or natural pine in high priority units. In both cases, planting will follow. White pine will be planted within the area of protection and Douglas fir, spruce, or cedar in the protection strip, according to the site. Early planting of these species is planned. White pine planting will be deferred until the area has been made safe. This policy will apply to all white pine planting. The production of white pine at Savenac and other nurseries which may be developed in the region will be correlated with the plans developed under unit analyses.

Investigation of chemical methods is moving forward under Bureau direction. As fast as new chemicals and methods of application are proven, they are put into practice on an administrative scale.

Analysis of the white pine units has been a continuing project throughout the year. A first run of these units under the scheme set up by the Matthews-Hutchison study was made last year. The need for boundary changes and better basic information was disclosed in many cases. Some revision of the specifications for the disease-stocking survey were indicated. These were worked out jointly by the Bureau, N.R.M. Station, and Division of Timber Management in the Regional Office. The survey was pushed forward into new units and "fill in" strips were run in certain units where more intensive information was needed. The project was financed by the Region. Technical direction and general supervision were again in the hands of R. T. Bingham.

Early in the summer, Don Moore, formerly in charge of the National Forest operation on the St. Joe, was transferred to the Division of Timber Management to assist in the unit analysis work. The information needed for the completion of all units to be considered in any probable program has been assembled. Re-analysis of these units is going ahead and is expected to be complete by February. Before spring we expect to have the program for National Forests set up on the basis of these analyses and shaped to fit the needs of the regional economy with respect to the production of the greatest amount of pine for the dollars expended. Community and industry dependency will be considered. Each unit analysis considers the work done, the work remaining to be done, and the timing necessary for most effective control at least cost. Each one provides for the complete integration of all phases of white pine management and represents an integral part of the whole which can be placed in or removed from a given size program without affecting other units.

The expenditures and progress in blister rust control by the U. S. Forest Service are summarized in the following tables:

1. Expenditures in 1949

Clearwater	\$175,189
St. Joe	261,184
Coeur d'Alene	177,367
Kaniksu	143,091
Cabinet	94,215
Kootenai	<u>84,700</u>
Total	\$935,746

2. Expenditures 1930-1949

<u>Forest</u>	<u>Regular Funds</u>	<u>Emergency Funds</u>	<u>Total</u>
Clearwater	\$1,513,162	\$ 413,455	\$ 1,926,617
St. Joe	2,829,119	383,340	3,212,459
Coeur d'Alene	1,652,201	669,810	2,322,011
Kaniksu	1,614,670	458,055	2,072,725
Kootenai	459,482	28,233	487,715
Cabinet	<u>652,124</u>	<u>258,477</u>	<u>910,601</u>
Total	\$8,720,758	\$2,211,370	\$10,932,128

3. Ribes Eradication by Forest Service Crews in 1949

<u>Forest</u>	<u>Initial</u>	<u>Rework</u>	<u>Total</u>	<u>Man-Days</u>	<u>Ribes</u>	<u>Per Acre</u>	
	<u>Worked</u> <u>Acres</u>		<u>Worked</u> <u>Acres</u>			<u>Man-Days</u>	<u>Ribes</u>
Clearwater	1,970	7,870	9,840	5,650	319,000	.57	32
St. Joe	1,510	14,220	15,730	11,290	484,000	.72	31
Coeur d'Alene	220	4,410	4,630	6,010	242,000	1.30	52
Kaniksu	540	4,870	5,410	4,870	224,000	.90	41
Cabinet	1,640	840	2,480	3,700	192,000	1.49	77
Kootenai	<u>1,040</u>	<u>980</u>	<u>2,020</u>	<u>2,730</u>	<u>271,000</u>	<u>1.35</u>	<u>134</u>
Total	6,920	33,190	40,110	34,250	1,732,000	.85	43

4. Net Progress on National Forest Lands, 1923-1949

<u>Forest</u>	<u>First</u>	<u>Second</u>	<u>Third</u>	<u>Maintenance</u> <u>Acres</u>	<u>Unworked</u> <u>Acres</u>	<u>Total</u> <u>Acres</u>
	<u>Working</u> <u>Acres</u>	<u>Working</u> <u>Acres</u>	<u>Working</u> <u>Acres</u>			
Clearwater	153,000	59,000	17,000	40,000	47,000	200,000
St. Joe	217,000	95,000	43,000	70,000	97,000	314,000
Coeur d'Alene	309,000	58,000	18,000	87,000	52,000	361,000
Kaniksu	271,000	80,000	18,000	94,000	86,000	357,000
Cabinet	65,000	10,000	4,000	31,000	9,000	74,000
Kootenai	<u>55,000</u>	<u>5,000</u>		<u>32,000</u>	<u>44,000</u>	<u>99,000</u>
Total	1,070,000	307,000	100,000	354,000	335,000	1,405,000

BLISTER RUST CONTROL ON NATIONAL PARKS

Herman E. Swanson, Regional Leader

Calendar Year 1949

Reports have been prepared for blister rust control in Mount Rainier, Glacier, and Yellowstone National Parks. The following discussion briefly summarizes the situation for these parks in the Northwestern Region.

In Mount Rainier, the mop-up work of the last 2 years has eradicated by the use of 2,4,5-T serious concentrations of ribes in stream bottoms and on precipitous slopes within and adjacent to the control area boundaries. As mentioned in previous reports, the blister rust damage in Rainier has been heavy, but this condition should be considerably checked by the recent ribes eliminations.

In Glacier, work is progressing very well on the important control areas and large scale work was completed in 1949. Immediate future annual requirements call for a small rework crew with a slight increase when the Oldman Lake area is due for rework.

In Yellowstone, work is practically up to schedule although fire duty shortened the 1949 season considerably. Fortunately the majority of the ribes has been eradicated on the control areas ahead of the finding of rust on pine. Infection on ribes has been found in many places in the park and also beyond the park to the east and south. The nearest known blister rust infection on white pine is in Sunlight Creek 2 miles north of the park boundary.

In view of the more efficient methods of ribes eradication recently developed, the Bureau has suggested to National Park officials that consideration be given to adding 3,500 acres to the Mount Washburn control area. This expansion would bring most of the head of the Carnelian Creek drainage representing an excellent stand of Pinus albicaulis under protection. The present control area is so small that much of it represents protection zone only. The recommended larger area, by virtue of its size and more advantageous use of topographic features as boundaries, would largely be protected area.

Expenditures and accomplishments in blister rust control are presented in the following summaries:

1. Expenditures by National Park Service

<u>National Park</u>	<u>Calendar Year 1949</u>	<u>All Years</u>
Mount Rainier	\$11,901	\$134,684
Glacier	30,506	131,537
Yellowstone	33,828	137,182
Rocky Mountain	-	742
Total	\$76,235	\$404,145

2. Ribes Eradication in 1949

<u>National Park</u>	<u>First</u>	<u>Second</u>	<u>Other</u>	<u>Total</u>		<u>Ribes</u>	<u>Per Acre</u>	
	<u>Working</u>	<u>Working</u>	<u>Workings</u>	<u>Acres</u>	<u>Man-Days</u>		<u>Man-Days</u>	<u>Ribes</u>
	<u>Acres</u>	<u>Acres</u>	<u>Acres</u>	<u>Acres</u>	<u>Man-Days</u>	<u>Ribes</u>	<u>Man-Days</u>	<u>Ribes</u>
Mount Rainier	-	360	180	540	572	45,000	1.06	83
Glacier	370	150	200	720	1,341	182,000	1.86	253
Yellowstone	<u>1,820</u>	<u>80</u>	<u>-</u>	<u>1,900</u>	<u>1,939</u>	<u>406,000</u>	<u>1.02</u>	<u>214</u>
Total	2,190	590	380	3,160	3,852	633,000	1.22	200

3. Gross Acreage Worked, 1930-1949

<u>National Park</u>	<u>First</u>	<u>Second</u>	<u>Other</u>	<u>Total</u>		<u>Ribes</u>	<u>Per Acre</u>	
	<u>Working</u>	<u>Working</u>	<u>Workings</u>	<u>Acres</u>	<u>Man-Days</u>		<u>Man-Days</u>	<u>Ribes</u>
	<u>Acres</u>	<u>Acres</u>	<u>Acres</u>	<u>Acres</u>	<u>Man-Days</u>	<u>Ribes</u>	<u>Man-Days</u>	<u>Ribes</u>
Mount Rainier	8,263	4,687	10,100	23,050	24,608	2,420,000	1.07	105
Glacier	5,140	3,619	2,569	11,328	12,416	1,260,000	1.10	111
Yellowstone	<u>9,200</u>	<u>1,558</u>	<u>152</u>	<u>10,910</u>	<u>8,366</u>	<u>1,150,000</u>	<u>.77</u>	<u>105</u>
Total	22,603	9,864	12,821	45,288	45,390	4,830,000	1.00	107

4. Work Status in the Net Control Area

<u>National Park</u>	<u>First</u>	<u>Second</u>	<u>Other</u>	<u>Maintenance</u>	<u>Unworked</u>	<u>Control Area</u>
	<u>Working</u>	<u>Working</u>	<u>Workings</u>			
	<u>Acres</u>	<u>Acres</u>	<u>Acres</u>	<u>Acres</u>	<u>Acres</u>	<u>Acres</u>
Mount Rainier	4,100*	3,900	9,880	3,000	-	4,100*
Glacier	5,140	3,619	2,569	2,846	-	5,140
Yellowstone	9,200	1,558	152	5,580	400	9,600**
Rocky Mountain	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>6,000</u>	<u>6,000**</u>
Total	18,440	9,077	12,601	11,426	6,400	24,840

* 510 acres added in 1949 as result of resurvey.

** Final acreage to be determined.

BLISTER RUST CONTROL, INLAND EMPIRE, 1949

By

Frank O. Walters
Assistant Regional Leader

Introduction

The integration of ribes eradication methods and continued refinements of techniques are producing better results on all operations. The one-man dragline method, contracting of ribes eradication work, and chemical methods were all factors contributing to greater accomplishments.

Chemical Methods

With a killing chemical and an efficient means of application to meet varying conditions, it is now possible to combine chemical methods with hand methods to achieve lower costs. The hormone chemical 2,4,5-T kills all species of ribes in the Inland Empire and was used on all operations. Truck-mounted power sprayers were used in accessible areas to eliminate ribes concentrations in the upland and stream type. A high percentage of this work was done on recent burns and cutover areas before the pine had become established. Many such areas were treated with a broadcast spray. Last season's experience led to improvements in laying out areas and in spraying techniques. The spray nozzles were also improved. Much remains to be accomplished in developing more suitable equipment.

Hi-Fog guns and knapsack spray units were used to eradicate small scattered ribes concentrations when power units and hand pulling were not practical. Where a supply of water was available, the old knapsack units were used since they give a more complete application and a higher degree of kill.

A recent development is the use of a Buffalo turbine blower. The unit, which is mounted on a turntable, is carried on a trailer. The blower's nozzle can be turned in a complete circle, and the chemical directed at any angle. One man is required to operate the blower and one the equipment to tow it. The turbine generates a wind velocity of 150 miles per hour at the nozzle. When the chemical is introduced into the air stream, it becomes finely atomized and envelopes the brush with a fine fog-like mist. A highly concentrated chemical solution is used and only enough is applied to completely cover a given area. The unit will have its greatest use on stream type and logged over lands. Stream type can be treated when roads parallel the stream. On logged over lands, the abundant roadside ribes can be sprayed and where roads are close together, large acreages can be completely covered by spraying the intervening ground from opposite directions. Field trials show that from 3 to 8 acres an hour can be treated.

Experimental tests, using a helicopter to dispense chemical of varying concentrations, were carried on for the first time in this region. The objectives were: (1) to study the possibilities of killing heavy brush and ribes occurring on burns endangering adjacent white pine stands, (2) to determine if the dead brush could be burned, opening the site for planting. It will not be possible to accurately determine results of tests until next season.

One-Man Dragline Method

With more experience in the one-man dragline method, improvements were made which increased both output and efficiency. Charts were maintained showing production and efficiency of individual workers. By keeping a close check on efficiency and production of the workers, some operations were able to materially reduce supervisory overhead. The constant knowledge of his progress was more of an incentive to a worker than constant supervision.

The training charts were revised to cover the one-man dragline method. Special attention was given to depicting proper techniques of search and of systematically covering the ground. Supervisory personnel gave special attention to "on the job" training since this is basic to successful performance under the one-man dragline method.

Ribes Eradication Contracting

Contracts were awarded on five of the six operations. On the Coeur d'Alene and Kaniksu, a substantial part of the work was accomplished under the contract system. Savings of 25 percent were estimated. Of particular significance is the fact that several isolated areas were worked under contract, eliminating the necessity of costly camp installations. On the Kaniksu and Coeur d'Alene operations, increasing numbers of workers are becoming interested, which creates competition tending to lower bid prices. When contracting becomes established on other operations, a similar development should follow.

SURVEYS

1. Checking

Checking was generally organized to aid ribes eradication work. Checkers assisted in laying out work lanes and marking off the lots. Checks were made by individual lots and were kept close to the current work, so that workers could be constantly informed as to the efficiency of their work. All operations carried on post check when possible. This phase of the work, postponed during and immediately after the war, is gradually being brought up to date.

2. Mt. Spokane Stocking-Rust Damage Survey

A survey was run on lands in the vicinity of Mt. Spokane and in Spirit Creek in October to determine the status of this area. Control work on these lands was discontinued with the end of the WPA program. The results of the survey show the need for properly timed workings in young stands until a stabilized vegetative cover has become established. Damage to reproduction over much of the area is too high to warrant further control efforts. It appears that the older pole stands on Mt. Spokane have been given sufficient protection to bring them through to maturity.



The Buffalo turbine blower operating on cutover areas.

W-670

3. Stocking-Blister Rust Damage Survey

Data secured on the basis of the comprehensive stocking-blister rust damage surveys helped determine the economic feasibility of growing pine on units set up for control, as well as the general suitability of the unit. The surveys carried on during the past 2 years are nearing completion.

All data including stocking, site, incident of the disease, working conditions, ultimate yield, and cost of establishing complete control are analyzed to determine if white pine can be profitably grown on a given unit. In the analysis of National Forest lands, control and management plans are built up for each acceptable unit. Long range objectives in the management of a unit call for the maximum possible yield of white pine in each selected unit by capturing mortality through early and continued cuttings, fill-in plantings, growing white pine on all ground that will support it, and suppression of ribes over the entire unit through silvicultural practices. The units are arranged in priority of value and protected accordingly. Units which do not meet prescribed standards are not considered for control.

SUMMARY OF PROGRESS BY OPERATIONS

Clearwater Operation

Under the Bureau of Entomology and Plant Quarantine cooperative program, work was conducted on lands in the Clearwater Timber Protective Association. Control work was carried on in the well stocked cutover lands in the vicinity of C. T. P. A. Headquarters and in Rhodes Creek. Ribes were generally heavy in both areas and reworkings will be necessary. All initial work was completed in the Hildebrand drainage where a high quality work was secured. Since ribes populations were originally light on much of the area, the rework load will not be difficult. Work was completed on the pole stands in the vicinity of Pierce, and no future work will be necessary unless logging disturbances occur. A truck-mounted power spray unit was effectively used to do broadcast spraying on areas of numerous small ribes in Hildebrand Creek and Rhodes Creek.

The Forest Service carried on protective work in pole stands and cutover lands in Orofino Creek and Musselshell drainages. The work was speeded up by roadside spraying operations in cutover areas in the Orofino Creek unit. Work was carried on in plantations in Sylvan Creek and in the vicinity of Musselshell Administrative Site. The fine pole stands in the Tamarack and Sylvan drainages were given a final working. The objectives on the National Forest lands are to protect extensive pole stands and to keep ribes eradication in pace with the accelerated cutting of white pine stands, so these lands may continue to produce white pine.

St. Joe Operation

Bureau cooperative work was carried on in the Hog Meadows, Corral Creek units, and the upper portion of the Cougar Creek unit. These units represent extensive mediumly stocked reproduction stands which are still filling in and it appears that complete stocking will eventually result. Twenty-five percent of the area worked in the Hog Meadows and Corral units was placed on maintenance.

Additional work is planned for these units in 1950. All current work was completed on the Cougar Creek unit and 50 percent of this year's work was placed on maintenance. All future work will be determined on the basis of post checks.

Forest Service personnel worked in the extensive pole stands in the Palouse division and in the vicinity of Clarkia and the Emida Camp. It was expected that most of the pole could be placed on maintenance, but because of soil disturbances resulting from blowdown and snow damage to the timber, most of it must be held in the post check category.

Effective work was accomplished with a power spray unit in destroying ribes on cutover areas along the Palouse River which were a hazard to pole stands across the river.

Kaniksu Operation

The Bureau cooperative program was confined to the Fox Creek and Big Creek units. Regular labor completed the work needed in reproduction areas in lower Big Creek. Highly efficient work was obtained and future work in this portion of the unit will be determined on the basis of post checks. Future work in this unit will be carried on under the contract system. Six contracts were awarded in the Fox Creek unit; four were completed in 1949, extensions were granted on two. All work in this unit will be completed next year by contractors. All completed contract areas met maintenance standards.

Forest Service crews working in Fedar Creek completed work in this unit, placing it on maintenance. Reproducing cutover lands in the vicinity of the Boswell and Pelke Administrative Sites were worked; ribes regeneration is still occurring on these areas and future work will be necessary.

Hand spraying in the vicinity of Hungry Mountain and power units on Diamond Peak were utilized to eliminate heavy ribes concentrations in order to protect the extensive plantations below in the Kalispell drainage.

Most of the currently needed work in reproduction and plantations in the lower West Branch Unit was completed by contractors.

Coeur d'Alene Operation

Protection was afforded to reproduction and plantation areas in Brett Creek, Upper Independence Creek, Jordan Creek, Hudlow Creek, and Cathedral. The Coeur d'Alene Forest has the most extensive and solid blocks of white pine plantations in the region; to date protection has been adequate and every effort is being made to meet necessary rework schedules. Pole stands were worked in Upper Deception Creek and along Iron Creek. Work was continued on the large Riley Creek unit of pole timber. Two more seasons' work will be needed to place the bulk of this unit on maintenance.

A power sprayer, Hi-Fog guns, and knapsack units were used to destroy heavy ribes concentrations in the Packsack Ridge area. These ribes were a menace to the plantations in Senator Creek and portions of the Brett Creek drainage. Contractors worked plantations and reproduction areas in Snowbird, Senator Creek, Brett Creek, and Nicholas Creek. Future work in these drainages will be carried on by contractors.

Cabinet Operation

Work was continued in Martin Creek. White pine reproduction occurs throughout the entire drainage and it is necessary to eliminate heavy ribes concentrations in the upper portions of the area to protect the adjacent pine and the extensive pine areas below. Hi-Fog guns, knapsack units, and a power sprayer were well integrated with hand methods to work difficult areas. Long leads of main line from the power sprayer were strung down into Martin Creek from the ridge road making it possible to spray heavy ribes concentrations. In the lower portions of the drainage, maintenance conditions have been achieved, but future rework will be required in the upper part. Only a short season's work remains to complete initial work in this drainage. All but 25 acres of initial work was completed in the plantations and reproduction stands in Robin Run Creek. Only limited parts of this drainage will require future workings. Work was initiated in the White Pine Creek drainage which comprises extensive areas of planted pine. Initial work was not completed during 1949 because of fire duty. Only a small amount of work remains.

Kootenai Operation

Work was completed in the Spar Lake unit. The area comprises 9,000 acres of predominately excellent pole timber. As a result of this year's work, over 60 percent of the unit is now on a maintenance basis.

STATEMENT OF EXPENDITURES AND COSTS

The statement of expenditures is shown in the following table.

TABLE 1

CLASSIFIED EXPENDITURES IN INLAND EMPIRE, 1949

Item	Bureau of Entomology and Plant Quarantine					Forest Service BLR-4	Total
	BLR-1-4	Cooperative Control			Total		
		Federal BLR-3-4	State & Private	Total			
Contract ribes erad.		\$ 5,056		\$ 5,056	\$ 5,056	\$ 36,125	\$ 41,181
Salary perm. men	\$45,906	4,460	\$ 2,165	6,625	52,531	56,584	109,115
Salary temp. men	158	17,473	14,786	32,259	32,417	76,686	109,103
Wages temp. labs.	540	53,805	19,068	72,873	73,413	522,362	595,775
Subs. supplies	2,978	12,874		12,874	15,852	132,817	148,669
Equipment	878	155		155	1,033	27,048	28,081
Travel and transp.	4,087	1,538		1,538	5,625	30,100	35,725
Other expenses	5,414	4,091		4,091	9,505	54,021	63,526
Total	\$59,961	\$99,452	\$36,019	\$135,471	\$195,432	\$935,743	\$1,131,175

TABLE 2

SUMMARY OF RIBES ERADICATION, 1949
INLAND EMPIRE

Working	Eradication Type	Year of Origin	Acres	Man-Days	Ribes	Per Acre	
						Man-Days	Ribes
First	Plantation	1945-49	350	390	11,000	1.11	31
	Cutover	1945-49	1,570	1,170	203,000	.75	129
	Cutover	1940-44	970	880	110,000	.91	113
	Cutover	1920-39	30	70	7,000	2.33	233
	Reproduction	1910-39	1,970	3,190	211,000	1.62	107
	Pole		2,130	3,060	273,000	1.44	128
	Mature		120	400	69,000	3.33	575
	Stream		470	1,020	122,000	2.17	260
	Total		7,610	10,180	1,006,000	1.34	132
Second	Plantation	1945-49	50	30	1,000	.60	20
	Cutover	1945-49	180	270	28,000	1.50	156
	Plantation	1940-44	360	310	20,000	.86	56
	Cutover	1940-44	1,260	1,920	123,000	1.52	98
	Cutover	1920-39	920	980	18,000	1.07	20
	Reproduction	1910-39	6,900	5,800	167,000	.84	24
	Pole		6,790	3,830	103,000	.56	15
	Mature		210	190	13,000	.90	62
	Stream		450	600	28,000	1.33	62
	Total		17,120	13,930	501,000	.81	29
Third	Plantation	1945-49	380	520	30,000	1.37	79
	Plantation	1940-44	20	40	1,000	2.00	50
	Cutover	1940-44	390	290	35,000	.74	90
	Cutover	1920-39	2,310	1,510	48,000	.65	21
	Reproduction	1910-39	6,080	6,540	128,000	1.08	21
	Pole		13,370	6,950	172,000	.52	13
	Mature		780	160	2,000	.21	3
	Stream		1,730	1,850	90,000	1.07	52
	Total		25,060	17,860	506,000	.71	20
GRAND TOTAL			49,790	41,970	2,013,000	.84	40

Chemical Work Included Above:

Working	Acres	Man-Days	Gallons Spray
First	700	1,470	27,000
Second	380	440	13,000
Third	310	420	20,000
Total	1,390	2,330	60,000

TABLE 3

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1949
INLAND EMPIRE

State	Working	Class	Acres	Man-Days	Ribes	Gallons Spray	Per Acre	
							Man-Days	Ribes
Idaho	First	EQ-Coop.	690	490	42,000	50	.71	61
		FS-Reg.	4,170	4,710	513,000	19,460	1.13	123
		Total	4,860	5,200	555,000	19,510	1.07	114
	Second	EQ-Coop.	5,280	4,930	169,000	9,800	.93	32
		FS-Reg.	10,010	7,340	269,000	3,000	.73	27
		Total	15,290	12,270	438,000	12,800	.80	29
	Third	EQ-Coop.	3,710	2,300	70,000	200	.62	19
		FS-Reg.	20,790	14,720	335,000	2,800	.71	16
		Total	24,500	17,020	405,000	3,000	.69	17
	All Workings	EQ-Coop.	9,680	7,720	281,000	10,050	.80	29
		FS-Reg.	34,970	26,770	1,117,000	25,260	.77	32
		Total	44,650	34,490	1,398,000	35,310	.77	31
Montana	First	FS-Reg.	2,670	4,680	401,000	5,740	1.75	150
	Second	FS-Reg.	1,740	1,620	56,000		.93	32
	Third	FS-Reg.	90	130	6,000	300	1.44	67
	All Workings	FS-Reg.	4,500	6,430	463,000	6,040	1.43	103
Washington	First	FS-Reg.	80	300	50,000	1,750	3.75	625
	Second	FS-Reg.	90	40	7,000	200	.44	78
	Third	FS-Reg.	470	710	95,000	16,700	1.51	202
	All Workings	FS-Reg.	640	1,050	152,000	18,650	1.64	238
Total	First	EQ-Coop.	690	490	42,000	50	.71	61
		FS-Reg.	6,920	9,690	964,000	26,950	1.40	139
		Total	7,610	10,180	1,006,000	27,000	1.34	132
	Second	EQ-Coop.	5,280	4,930	169,000	9,800	.93	32
		FS-Reg.	11,840	9,000	332,000	3,200	.76	28
		Total	17,120	13,930	501,000	13,000	.81	29
	Third	EQ-Coop.	3,710	2,300	70,000	200	.62	19
		FS-Reg.	21,350	15,560	436,000	19,800	.73	20
		Total	25,060	17,860	506,000	20,000	.71	20
	All Workings	EQ-Coop.	9,680	7,720	281,000	10,050	.80	29
		FS-Reg.	40,110	34,250	1,732,000	49,950	.85	43
		Total	49,790	41,970	2,013,000	60,000	.84	40

Contract Work Included Above:

Working	Bureau of Entomology and Plant Quarantine			Forest Services		
	Acres	Man-Days	Ribes	Acres	Man-Days	Ribes
Second	40	70	3,000	920	690	33,000
Third	430	250	2,000	1,650	1,650	30,000
Total	470	320	5,000	2,570	2,340	63,000

TABLE 4

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1949
INLAND EMPIRE

State	Working	Number of Acres Worked															
		By Forest Service					By Bureau of Entomology and Plant Quarantine				Total Federal			Total Other			GRAND TOTAL
		National Forest	Public Domain	State	Private	Total	National Forest	State	Private	Total	National Forest	Public Domain	Total	State	Private	Total	
Idaho	First	3,290			880	4,170	30	250	410	690	3,320		3,320	250	1,290	1,540	4,860
	Second	7,970		560	1,480	10,010	2,060	1,830	1,390	5,280	10,030		10,030	2,390	2,870	5,260	15,290
	Third	16,230	210	480	3,870	20,790	220	1,510	1,980	3,710	16,450	210	16,660	1,990	5,850	7,840	24,500
	Total	27,490	210	1,040	6,230	34,970	2,310	3,590	3,780	9,680	29,800	210	30,010	4,630	10,010	14,640	44,650
Montana	First	2,670				2,670					2,670		2,670				2,670
	Second	1,740				1,740					1,740		1,740				1,740
	Third	90				90					90		90				90
	Total	4,500				4,500					4,500		4,500				4,500
Washington	First	80				80					80		80				80
	Second	90				90					90		90				90
	Third	320			150	470					320		320		150	150	470
	Total	490			150	640					490		490		150	150	640
Total	First	6,040			880	6,920	30	250	410	690	6,070		6,070	250	1,290	1,540	7,610
	Second	9,800		560	1,480	11,840	2,060	1,830	1,390	5,280	11,860		11,860	2,390	2,870	5,260	17,120
	Third	16,640	210	480	4,020	21,350	220	1,510	1,980	3,710	16,860	210	17,070	1,990	6,000	7,990	25,060
	Total	32,480	210	1,040	6,380	40,110	2,310	3,590	3,780	9,680	34,790	210	35,000	4,630	10,160	14,790	49,790

TABLE 5

RIBES SPECIES ERADICATED, 1949
INLAND EMPIRE

Working	Eradication Type	Acres	Ribes Species					Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes inerme	Ribes coloradense	
First	Plantation (1945-49)	350	2,000	9,000				11,000
	Cutover (1945-49)	1,570	26,000	161,000	16,000			203,000
	Cutover (1940-44)	970	74,000	35,000		1,000		110,000
	Cutover (1920-39)	30	4,000	3,000				7,000
	Reproduction (1910-39)	1,970	106,000	105,000				211,000
	Pole	2,130	258,000	13,000	1,000		1,000	273,000
	Mature	120	67,000	1,000			1,000	69,000
	Stream	470	99,000	3,000	1,000	19,000		122,000
	Total	7,610	636,000	330,000	18,000	20,000	2,000	1,006,000
Second	Plantation (1945-49)	50	1,000					1,000
	Cutover (1945-49)	180	1,000	27,000				28,000
	Plantation (1940-44)	360	13,000	7,000				20,000
	Cutover (1940-44)	1,260	25,000	97,000	1,000			123,000
	Cutover (1920-39)	920	11,000	7,000				18,000
	Reproduction (1910-39)	6,900	91,000	75,000		1,000		167,000
	Pole	6,790	76,000	26,000			1,000	103,000
	Mature	210	13,000					13,000
	Stream	450	27,000	1,000				28,000
	Total	17,120	258,000	240,000	1,000	1,000	1,000	501,000
Third	Plantation (1945-49)	380	3,000	27,000				30,000
	Plantation (1940-44)	20	1,000					1,000
	Cutover (1940-44)	390	9,000	26,000				35,000
	Cutover (1920-39)	2,310	27,000	21,000				48,000
	Reproduction (1910-39)	6,080	50,000	73,000	1,000	4,000		128,000
	Pole	13,370	74,000	97,000	1,000			172,000
	Mature	780	2,000					2,000
	Stream	1,730	79,000	1,000	6,000	3,000	1,000	90,000
	Total	25,060	245,000	245,000	8,000	7,000	1,000	506,000
All Workings	Plantation (1945-49)	780	6,000	36,000				42,000
	Cutover (1945-49)	1,750	27,000	188,000	16,000			231,000
	Plantation (1940-44)	380	14,000	7,000				21,000
	Cutover (1940-44)	1,520	108,000	158,000	1,000	1,000		268,000
	Cutover (1920-39)	3,260	42,000	31,000				73,000
	Reproduction (1910-39)	14,950	247,000	253,000	1,000	5,000		506,000
	Pole	22,290	408,000	136,000	2,000		2,000	548,000
	Mature	1,110	82,000	1,000			1,000	84,000
	Stream	2,650	205,000	5,000	7,000	22,000	1,000	240,000
	Total	49,790	1,139,000	815,000	27,000	28,000	4,000	2,013,000

TABLE 6
SUMMARY OF RIBES ERADICATION, 1923-1949
INLAND EMPIRE

Working	Eradication Type	Year of Origin	Gross Acres Worked	Man-Days	Ribes	Per Acre		Net Acreage Remaining	
						Man-Days	Ribes	Worked	Unworked
First	Burn	1940-49	1,000	1,000	213,000	1.00	213	1,000	
	Plantation	1940-49	8,000	10,000	2,263,000	1.25	283	8,000	1,000
	Cutover	1940-49	19,000	21,000	6,583,000	1.11	346	19,000	143,000
	Cutover	1920-39	86,000	84,000	24,858,000	.98	289	82,000	241,000
	Reproduction	1910-39	608,000	685,000	183,402,000	1.13	302	597,000	160,000
	Pole		375,000	163,000	28,719,000	.43	77	370,000	82,000
	Mature		709,000	299,000	63,366,000	.42	89	527,000	190,000
	Miscellaneous		37,000	32,000	8,409,000	.86	227	34,000	10,000
	Stream		126,000	317,000	65,174,000	2.52	517	124,000	23,000
	Total		1,969,000	1,612,000	382,987,000	.82	195	1,762,000	850,000
Second	Plantation	1940-49	6,000	6,000	414,000	1.00	69	6,000	
	Cutover	1940-49	3,000	4,000	366,000	1.33	122	3,000	
	Cutover	1920-39	58,000	64,000	13,297,000	1.10	229	58,000	
	Reproduction	1910-39	211,000	250,000	23,078,000	1.18	109	209,000	
	Pole		126,000	68,000	5,240,000	.54	42	125,000	
	Mature		44,000	28,000	3,022,000	.64	69	41,000	
	Miscellaneous		5,000	6,000	918,000	1.20	184	5,000	
	Stream		63,000	97,000	12,697,000	1.54	202	62,000	
	Total		516,000	523,000	59,032,000	1.01	114	509,000	
Third	Plantation	1940-49	4,000	3,000	129,000	.75	32	4,000	
	Cutover	1940-49	1,000	1,000	36,000	1.00	36	1,000	
	Cutover	1920-39	36,000	36,000	2,166,000	1.00	60	36,000	
	Reproduction	1910-39	75,000	99,000	3,732,000	1.32	50	75,000	
	Pole		35,000	20,000	726,000	.57	21	35,000	
	Mature		4,000	3,000	287,000	.75	72	4,000	
	Miscellaneous		1,000	1,000	32,000	1.00	32	1,000	
	Stream		23,000	33,000	2,799,000	1.43	122	23,000	
	Total		179,000	196,000	9,907,000	1.09	55	179,000	
GRAND TOTAL			2,664,000	2,331,000	451,926,000	.88	170	2,450,000	

Chemical work included above:

	Working	Acres	Man-Days	Gallons Spray
First		25,000	58,000	1,629,000
Second		10,000	15,000	287,000
Third		5,000	6,000	80,000
Total		40,000	79,000	1,996,000



TABLE 7

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1923-1949
INLAND EMPIRE

State	Class	Gross Acres	Effective Man-Days	Total Ribes	Gallons Spray	Per Acre	
						Man-Days	Ribes
Idaho	EQ-Reg.	49,000	21,000	5,000,000	80,000	.43	102
	EQ-Coop.	291,000	179,000	25,000,000	236,000	.62	86
	EQ-Emerg.	515,000	404,000	97,000,000	214,000	.78	188
	FS-Reg.	525,000	549,000	86,000,000	538,000	1.05	164
	FS-Emerg.	338,000	216,000	57,000,000	125,000	.64	169
	CCC	591,000	662,000	124,000,000	657,000	1.12	210
	Total	2,309,000	2,031,000	394,000,000	1,850,000	.88	171
Montana	EQ-Reg.	2,000	3,000	1,000,000	35,000	1.50	500
	EQ-Emerg.	66,000	31,000	6,000,000	1,000	.47	91
	FS-Reg.	50,000	64,000	6,000,000	54,000	1.28	120
	FS-Emerg.	36,000	36,000	7,000,000	22,000	1.00	194
	CCC	14,000	12,000	1,000,000	6,000	.86	71
	Total	168,000	146,000	21,000,000	118,000	.87	125
Washington	EQ-Emerg.	65,000	63,000	18,000,000		.97	277
	FS-Reg.	64,000	52,000	12,000,000	28,000	.81	188
	FS-Emerg.	36,000	14,000	4,000,000		.39	111
	CCC	22,000	25,000	3,000,000		1.14	136
	Total	187,000	154,000	37,000,000	28,000	.82	198
Total	EQ-Reg.	51,000	24,000	6,000,000	115,000	.47	118
	EQ-Coop.	291,000	179,000	25,000,000	236,000	.62	86
	EQ-Emerg.	646,000	498,000	121,000,000	215,000	.77	187
	FS-Reg.	639,000	665,000	104,000,000	620,000	1.04	163
	FS-Emerg.	410,000	266,000	68,000,000	147,000	.65	166
	CCC	627,000	699,000	128,000,000	663,000	1.11	204
	Total	2,664,000	2,331,000	452,000,000	1,996,000	.88	170

Contract work included above:

Acres	Man-Days	Ribes
4,000	3,000	83,000

TABLE 8

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1923-1949
INLAND EMPIRE

State	Ownership	Net Acres in Control Area					
		Acres Worked				Acres Unworked	Total Acres
		First	Second	Third	Total		
Idaho	National Forest	860,000	262,000	86,000	1,208,000	251,000	1,111,000
	Public Domain	17,000	6,000	3,000	26,000	13,000	30,000
	Subtotal Federal	877,000	268,000	89,000	1,234,000	264,000	1,141,000
	State	225,000	68,000	24,000	317,000	123,000	348,000
	Private	407,000	113,000	45,000	565,000	359,000	766,000
	Subtotal Other	632,000	181,000	69,000	882,000	482,000	1,114,000
	Total	1,509,000	449,000	158,000	2,116,000	746,000	2,255,000
Montana	National Forest	120,000	15,000	4,000	139,000	53,000	173,000
	State	1,000			1,000		1,000
	Private	19,000	3,000	2,000	23,000	15,000	34,000
	Subtotal Other	20,000	3,000	2,000	24,000	15,000	35,000
	Total	140,000	18,000	6,000	163,000	68,000	208,000
Washington	National Forest	90,000	30,000	10,000	131,000	31,000	121,000
	State	7,000	4,000	2,000	13,000	1,000	8,000
	Private	16,000	8,000	3,000	27,000	4,000	20,000
	Subtotal Other	23,000	12,000	5,000	40,000	5,000	28,000
	Total	113,000	42,000	15,000	171,000	36,000	149,000
Total	National Forest	1,070,000	307,000	100,000	1,477,000	335,000	1,405,000
	Public Domain	17,000	6,000	3,000	26,000	13,000	30,000
	Subtotal Federal	1,087,000	313,000	103,000	1,503,000	348,000	1,435,000
	State	233,000	72,000	26,000	331,000	124,000	357,000
	Private	442,000	124,000	50,000	616,000	378,000	820,000
	Subtotal Other	675,000	196,000	76,000	947,000	502,000	1,177,000
	Total	1,762,000	509,000	179,000	2,450,000	850,000	2,612,000

BLISTER RUST CONTROL, CLEARWATER OPERATION, 1949

By

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INTRODUCTION

Blister rust control activities were continued on the Clearwater operation for the twenty-first consecutive year. The 1949 program consisted of three camps operated by the Bureau of Entomology and Plant Quarantine and four camps by the Forest Service. In addition to these regular camps, the Bureau awarded one ribes eradication contract on a competitive bid basis. The work was located within the 488,000 acre control area to conform to an established plan of priority. The first camp started on May 19, and the last camp on the operation closed on September 6. The peak of employment was reached June 25 with 319 workers.

The labor supply improved materially over that of the past few years, but the lack of skilled workers was still very noticeable. For the first time in several seasons, the labor turnover did not handicap the work. Recreational facilities and intercamp athletic competition were provided. The 48-hour week, which was in effect from the start of the season until the first of August, brought about definite reductions in man-day costs, increased production, and improved morale. When the camps went back to the 40-hour week, due to shortage of funds, there was no appreciable loss of personnel as workers realized that the season would thereby be prolonged.

For the first time in many years, Bureau camps were called for fire fighting duty. One entire camp was called on fire by the Clearwater Timber Protective Association, but this occurred on a week end and did not interfere with ribes eradication activities. On August 20, all available Bureau employees were called by the Forest Service for duty on the Nezperce and Payette National Forests, which marked the end of the blister rust season for most of the men. Forest Service blister rust crews spent a total of 1,889 man-days on fire. Due to fire duty, most Forest Service camps ceased to operate at full efficiency after August 15. Thereafter work was confined to blocking in areas and completing needed rework. Early closing of Forest Service camps would have been necessary as allotments were exhausted and fire helped provide a full period of employment. Fire duty, as usual, resulted in a loss of crew efficiency.

LOCATION AND DESCRIPTION OF AREAS

Cooperative Camps on State and Private Lands

Work again was directed to top priority portions of three general white pine areas designated as the Headquarters, Hollywood, and Pierce blocks, each of which involves several working units. These blocks do not encompass all of the white pine area which warrants protection, but due to the small cooperative project, work is concentrated where the greatest values can be protected per dollar expended. The selection of these work areas is in accordance with the general work plan which considers such factors as intensity of disease, status of control, diversity of age classes, stocking, and accessibility of areas. In 1949, the camps were located at Blister Rust Headquarters, Rhodes Creek, and Reeds Creek.

Camp 100, BRC Headquarters. Workers from this camp completed first working, started last season, on Hildebrand Creek in the area cut over from 1940 to 1943. Ribes concentrations were comparatively light for this type of area on the Clearwater. On Hildebrand Creek, several areas varying in size from 40 to 140 acres were reworked where post check indicated that it was necessary. This was second or third working in either older cutover or pole type. Ribes concentrations and working conditions were light. To protect adjacent excellent pole stands in Canal Gulch, 225 acres cut over in 1942 were worked initially. The heavy roadside ribes populations had been reduced the previous season by applying 2,4,5-T with power spray equipment. Eighty-seven ribes were removed per acre at an expenditure of .7 man-day per acre. Initial work was started on Brown's Creek in area cut from 1941 to 1943. Because of fire duty, only 90 acres were covered, but it appears that this will be an easy area to protect. An average of 17 ribes per acre was removed at less than a half man-day per acre. Men from this camp also reworked some stream type within the pole stand adjacent to Orofino Creek near Pierce.

The area worked constitutes an important part of the Pierce block and lies adjacent to areas covered last season. The first working on Hildebrand Creek was in area where the seed source is barely adequate, and it was necessary to protect the young white pine which came in immediately following logging by eradicating the ribes as soon as they were large enough to be located by the crews. The Canal Gulch cutting was in urgent need of working as the ribes present were a definite threat to the adjacent pole stand. Work on Brown's Creek should be completed next season since this is an excellent cutting resulting in very good stocking and can be protected at a nominal cost. Portions of the area given initial working by this camp will need another coverage in three or four years. The areas given second or third working should not need further attention unless some disturbance occurs.

Camp 101, Rhodes Creek. Crews from this camp worked entirely within the Rhodes Creek drainage. Necessary second and third working was done in the 1941-43 cutover area extending from the mouth of Rhodes Creek to the National Forest boundary on the east side of the stream and to the camp site on the west side. Brush and associated vegetation are more dense here than on the majority of areas of the same age making working conditions more difficult. Small bushes, especially Ribes lacustre, are a problem. Numerous small patches of ground with heavy concentrations of R. viscosissimum were treated with Hi-Fog guns using 2,4,5-T.

Rework was completed on the lower part of the drainage, a portion of the Pierce block, until the area logged this season is ready for work. The quality of work was satisfactory but the area has been too recently disturbed to classify as being on maintenance.

Camp 102, Reeds Creek. All work performed by crews from this camp was second or third working. Work centered around the Clearwater Timber Protective Association headquarters immediately adjacent to the area worked during the past two seasons. The portion of ground south of the highway presented rather difficult working conditions because of heavy vegetation and required approximately 2 man-days to remove 110 ribes per acre. Twenty-eight acres, sprayed in 1948 with insufficient chemical, were given another working. The ground north of the highway had better working conditions and required only a half man-day per acre to remove 12 ribes per acre.

All work performed from this camp was on high priority portions of the Headquarters block. Where a considerable number of ribes was removed, the area will need further work. The ground north of the highway has very few ribes remaining but cannot yet be placed on maintenance because some ribes are still appearing due to recent disturbances.

Chemical spraying by crews from cooperative camps was performed on Mutton Gulch, Rhodes Creek, Reeds Creek, and Orofino Creek. A 5-man crew using a power sprayer applied 2,4,5-T to 53 acres of cutover area on Mutton Gulch and 13 acres of cutover on Rhodes Creek. These areas supported considerable low brush which made it difficult to search out the small R. lacustre present. The broadcast spray method was used to eliminate costly searching. After power spraying was completed, three experienced men applied 2,4,5-T using knapsack sprayers on 114 acres of stream type rework on Deer Creek and on Reeds Creek from the mouth of Calhoun Creek east to the limits of the work area. Stream type on Orofino Creek at Pierce and vicinity was sprayed. This stream type work removed the highly dangerous R. petiolare bushes which constituted a threat to several hundred acres of reproduction in cutover areas and pole stands.

One ribes eradication contract was issued by the Bureau for work on 40 acres on St. Louis Gulch. A good quality of work was secured at a saving to the Government. The contract price was \$11.75 per acre.

Forest Service Camps on Federal Lands

The Forest Service camps were located to perform work in areas of high priority as determined by the working unit analysis. Special emphasis was placed on pole-size stands and established plantations. Cutover areas due for working this season were also covered with a view to keeping work current in this type. To meet these objectives, camps were established at Musselshell, Orofino Creek, Three Bear, and Tamarack Ridge.

Camp 151, Musselshell, was occupied again this season. Initial work in cutover area and plantations was done in 1949 together with rework in pole stands in the Musselshell drainage. Some ribes germination is still taking place in the Deer Creek plantations. The Dan Lee Creek Drainage, broadcast sprayed in 1948, was worked by hand eradication methods in 1949. On this area, it was noted that where heavy ribes populations occurred and a heavy dosage of spray solution had been applied, few bushes survived. Where bushes were scattered, an insufficient amount of solution had been used and ribes still remained. More thorough training in application of spray to individual bushes can eliminate this problem in the future.

Camp 152, Orofino Creek. In the Orofino Creek drainage, work was performed on 1945-1949 cutover areas and in 40- to 60-year-old pole stands. White pine is becoming established in the cutover portion. Broadcast power spraying with 2,4,5-T along roads and skid trails, where heavy concentrations of ribes occurred, greatly facilitated the working of this area.

Camp 153, Three Bear. Working was principally in 40- to 60-year-old stands in Tamarack Creek and Sylvan Creek. Working conditions varied greatly in the area and considerable difficulty was encountered in the brushy undercover. In the Tamarack area, the inaccessibility and steepness of the ground added to the cost of eradication.

Camp 154, Tamarack Ridge. Work was entirely in 40- to 60-year-old stands. A work road was constructed last year which made possible the establishment of a camp in this area. Working conditions were heavier than would normally be expected in this type of stand due to heavy alder glades at the head of practically all draws and the persistence of low brush which increased searching time. The stand is reaching the age where the canopy is rapidly closing and no further work should be necessary to protect the area. Considerable damage is occurring in this and the Camp 153 area from bears stripping the bark from the base of the trees in early spring. One attack is seldom fatal, but successive attacks finally cause girdling of the tree. In some cases, this has caused such damage to stocking that ribes are occurring in the resulting openings.

In addition to hand eradication work, power spraying was done in Orofino Creek on 1945-49 cutover areas. Both the Friend and Hardie sprayers were used. Work was principally along logging roads, skidways, and in a few spots where excessive germination had occurred.

METHODS AND EQUIPMENT

A training school was held for Forest Service blister rust control supervisors early in May. Bureau supervisors were given individual training and instruction prior to assuming their positions. A training school was held for all checkers. All eradication men were given intensive training in ribes eradication techniques with the aid of charts. The revised training charts and manual were a distinct aid in illustrating the one-man dragline method.

The one-man ribes eradication method was used by all camps and the merits of the system were demonstrated in increased efficiency and lower costs per acre. Individual efficiency and production ratings were kept and workers were advised of their respective standings. This contributed much to increasing the output per man-day. The Forest Service camps used a complete revision of the forms for reporting field data and found them satisfactory.

The hormone spray 2,4,5-T was used exclusively in chemical spraying. Flowable type emulsive oil was used as a spreader and sticker. A solution of 2,4,5-T and red dye for later identification of treated crowns was used in decapitation work. Power equipment was used where possible; otherwise, Hi-Fog guns and knapsack sprayers were employed. Some experimentation was conducted with spray and whirl discs for broadcast spraying where penetration through low brush was needed. The most satisfactory combination was an ordinary Hudson nozzle assembly with a small hole bored in the center of the whirl disc. This provided a solid cone and gave about 6 feet penetration through rather dense, low brush. The conventional Hudson disc was used for selective spraying. The Buffalo turbine blower was used experimentally on roadside work in St. Louis Gulch. The following tabulation shows data for power spraying work:

<u>Area</u>	<u>Eradication Type</u>	<u>Acres</u>	<u>Man-Days</u>	<u>Gallons Spray</u>
Mutton Gulch	Cutover 1940-44	53	70	6,800
Rhodes Creek	" " "	13	23	2,900
Orofino Creek	" 1945-49	210	168	7,535
St. Louis Gulch	" 1940-44	10	3	187

CHECKING

A crew consisting of five men employed by the Bureau and six men employed by the Forest Service conducted regular checks on all areas worked in 1949. Forest Service checkers were under the supervision of a checker foreman employed by the Forest Service. Bureau checkers were under the supervision of the assistant operation supervisor who also assisted with the Forest Service checking work. All checkers had previous ribes eradication experience but only one man had previous checking experience, necessitating intensive training and close supervision throughout the season.

A uniform system of checking areas worked by the one-man dragline method was adopted this year. Checkers progressed through the $2\frac{1}{2}$ -chain wide lanes on a diagonal course between the boundaries of the lane, completing four of these courses in each 4-chain lane, or each acre of ground. This system was modified on initial work where ribes were numerous or seedlings present by reducing the diagonal courses to two for each 4 chains of lane.

In addition to the regular check, advance checks were made on areas to be worked in 1949 where information was necessary on ribes distribution. Checks were also made on areas to be worked in 1950. Checkers laid all lines for eradication work.

WHITE PINE STOCKING AND DISEASE SURVEY

The white pine stocking and blister rust damage survey was continued on Clearwater National Forest lands during 1949 and initiated on lands of the Timber Protective Association. The Forest Service party was composed of two 2-man crews supervised by the checker foreman. The Bureau party consisted of two 2-man crews and a party leader. The survey was under the general supervision of the assistant operation supervisor. The survey was performed primarily in pole and reproduction stands, although on Association lands it was extended to cutover areas which had been logged for at least 15 years.

Surveys were made in the following working units:

<u>National Forest Units</u>	<u>Unit Number</u>
Gold Creek	10
Upper French Creek	17
Sylvan Creek	18
Tamarack Creek	19
Dan Lee and Swede Creeks	55
Orofino Creek	56

<u>Clearwater Timber Protective Association Units</u>	<u>Unit Number</u>
Mosquito Creek	1
Brown's Creek	3
Orofino Creek	6
Jaype	11
Three Mile Creek	12

Clearwater Timber Protective Association Units (contd.)Unit Number

Shanghai Creek	13
Orogrande Creek	14
Cardiff	15
Calhoun Creek	17
Deer Creek	18
Scofield Creek	24

One hundred and one miles of strip were run on Association lands which represented a sample of approximately 16,000 acres of pole, reproduction, and cutover stands.

Definite conclusions cannot be reached on results of the survey until all data have been summarized. The survey shows that in all young stands of white pine blister rust will cause losses in stocking. The losses vary with the number of years between the time the disease entered the stand and the time control was established. In many pole and reproduction stands, the disease entered prior to initiation of control measures.

A measure of site quality was taken on all survey strips in addition to the data on stocking and blister rust losses. This information shows that a high site quality predominates throughout the Clearwater pine-growing region.

CONTROL STATUS

Blister rust infection occurs generally throughout the control area. On lands of the Clearwater Timber Protective Association it has been necessary, because of the small program of recent years, to confine efforts to the Pierce, Hollywood, and Headquarters blocks. The white pine stocking, cost of protection, diversity of age classes, and accessibility of areas give these blocks highest priority. The present program barely provides for adequate work in these blocks. Consequently, large drainages which have been recently logged and the majority of those to be cut in the near future cannot be given any blister rust protection under the present program. In the older cuttings and where work was kept on a better schedule, satisfactory progress has been made and infection is light enough to assure very good white pine stands at maturity. Recently, additional problems have been created in some older cuttings. On areas near BRC headquarters and on Rhodes Creek, contract loggers have removed small patches of mature timber adjacent to protected cutover and pole stands. In the process of logging, there was much ground disturbance in these protected areas and as a result additional ribes eradication work will be necessary. Better coordination in timing the cuttings on these areas would materially reduce the cost of blister rust protection. Practically the entire acreage worked on Timber Protective Association lands was on cutover areas too recently disturbed to classify as maintenance. Most of the mature stands being cut were considered as on maintenance but the lands now revert to the unworked category. Land is being removed from the maintenance class faster than it is being added.

The situation is more favorable on lands of the Clearwater National Forest. From the working unit analysis, a work plan has been developed for the forest. The work plan contemplates proper timing of work on cutover areas, plantations, and areas of natural reproduction and pole stands which are considered for protection. The size of recent programs has been adequate. Cutting practices are established with a view to limiting ribes regeneration. Over 70 percent of the area worked by Forest Service crews this season was in pole type and a large portion of this is now on a maintenance basis. There is a total of 87,912 acres on maintenance on the entire Clearwater operation. As a result of the 1949 eradication and checking work, 2,890 acres were placed on a maintenance basis and 1,757 acres were removed from this classification because of logging operations and surveys.

STATEMENT OF EXPENDITURES AND COSTS

The following table shows the statement of expenditures.

TABLE 1

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1949 CLEARWATER OPERATION

Item	Bureau of Entomology & Plant Quarantine					Forest Service BLR-4	Total
	BLR-1-4	Cooperative Control			Total		
		Federal BLR-3-4	State & Private	Total			
Contract ribes erad.		\$ 470		\$ 470	\$ 470		\$ 470
Salary perm. men	\$11,376	1,133	\$ 2,165	3,298	14,674	\$ 7,800	22,474
Salary temp. men		8,811	11,931	20,742	20,742	19,591	40,333
Wages temp. labs.	150	23,832		23,832	23,982	98,019	122,001
Subsistence supplies		6,181		6,181	6,181	25,103	31,284
Equipment	248	49		49	297	2,579	2,876
Travel and transp.	905	454		454	1,359	9,562	10,921
Other expenses	1,487	2,092		2,092	3,579	12,533	16,112
Total	\$14,166	\$43,022	\$14,096	\$57,118	\$71,284	\$175,187	\$246,471

TABLE 2

SUMMARY OF RIBES ERADICATION, 1949
CLEARWATER OPERATION

Working	Eradication Type	Year of Origin	Acres	Man-Days	Ribes	Per Acre	
						Man-Days	Ribes
First	Plantation	1945-49	81	53	719	.65	9
	Cutover (3)	1945-49	1,487	1,035	195,380	.70	131
	Cutover	1940-44	520	381	32,225	.73	62
	Cutover	1920-39	32	75	7,030	2.34	220
	Pole		418	104	4,023	.25	10
	Mature		5	4	68	.80	14
	Stream (1)		120	28	2,834	.23	24
	Total		2,663	1,680	242,279	.63	91
Second	Cutover	1945-49	174	270	27,780	1.55	160
	Cutover (4)	1940-44	964	1,717	117,187	1.78	122
	Cutover	1920-39	86	47	3,873	.55	45
	Reproduction	1910-39	39	98	2,321	2.51	60
	Pole		2,061	1,222	36,947	.59	18
	Total		3,324	3,354	188,108	1.01	57
Third	Plantation	1945-49	64	20	1,149	.31	18
	Cutover	1940-44	148	95	6,238	.64	42
	Cutover	1920-39	768	338	14,671	.44	19
	Reproduction	1910-39	336	171	2,277	.51	7
	Pole		4,685	2,649	48,163	.57	10
	Mature		542	41	768	.08	1
	Stream (2)		114	38	2,114	.33	19
	Total		6,657	3,352	75,380	.50	11
GRAND TOTAL			12,644	8,386	505,767	.66	40

Chemical work included above:

Stream			Upland		
Acres	Man-Days	Gallons Spray	Acres	Man-Days	Gallons Spray
(1) 50	9	45	(3) 210	168	7,535
(2) 114	38	186	(4) 68	95	9,787

TABLE 3

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1949
CLEARWATER OPERATION

State	Working	Class	Acres	Man-Days	Ribes	Gallons Spray	Per Acre	
							Man-Days	Ribes
Idaho	First	EQ-Coop.	693	492	42,046	45	.71	61
		FS-Reg.	1,970	1,188	200,233	7,535	.60	102
		Total	2,663	1,680	242,279	7,580	.63	91
	Second	EQ-Coop.	1,010	1,696	118,286	9,787	1.68	117
		EQ-Cont.	40	68	2,774		1.70	69
		FS-Reg.	2,274	1,590	67,048		.70	29
		Total	3,324	3,354	188,108	9,787	1.01	57
	Third	EQ-Coop.	1,063	483	23,840	186	.45	22
		FS-Reg.	5,594	2,869	51,540		.51	9
		Total	6,657	3,352	75,380	186	.50	11
	All Workings	EQ-Coop.	2,766	2,671	184,172	10,018	.97	67
		EQ-Cont.	40	68	2,774		1.70	69
		FS-Reg.	9,838	5,647	318,821	7,535	.57	32
Total		12,644	8,386	505,767	17,553	.66	40	

TABLE 4

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1949
CLEARWATER OPERATION

State	Working	Acres Worked													GRAND TOTAL
		By Forest Service				By Bureau of Entomology and Plant Quarantine				Total Federal	Total Other				
		National Forest	State	Private	Total	National Forest	State	Private	Total	National Forest	State	Private	Total		
Idaho	First	1,598		372	1,970	33	248	412	693	1,631	248	784	1,032	2,663	
	Second	2,030	134	110	2,274		310	740	1,050	2,030	444	850	1,294	3,324	
	Third	5,047	422	125	5,594			1,063	1,063	5,047	422	1,188	1,610	6,657	
	Total	8,675	556	607	9,838	33	558	2,215	2,806	8,708	1,114	2,822	3,936	12,644	

TABLE 5

RIBES SPECIES ERADICATED, 1949
CLEARWATER OPERATION

Working	Eradication Type	Acres	Ribes Species			Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes petiolare	
First	Plantation (1945-49)	81	447	133	139	719
	Cutover (1945-49)	1,487	26,282	153,451	15,647	195,380
	Cutover (1940-44)	520	7,539	24,605	81	32,225
	Cutover (1920-39)	32	3,896	3,078	56	7,030
	Pole	418	2,198	1,264	561	4,023
	Mature	5	50		18	68
	Stream	120	1,447	117	1,270	2,834
	Total	2,663	41,859	182,648	17,772	242,279
Second	Cutover (1945-49)	174	832	26,669	279	27,780
	Cutover (1940-44)	964	21,553	94,889	745	117,187
	Cutover (1920-39)	86	3,671	157	45	3,873
	Reproduction (1910-39)	39	6	2,315		2,321
	Pole	2,061	22,525	14,001	421	36,947
	Total	3,324	48,587	138,031	1,490	188,108
Third	Plantation (1945-49)	64		1,149		1,149
	Cutover (1940-44)	148	1,729	4,440	69	6,238
	Cutover (1920-39)	768	2,737	11,673	261	14,671
	Reproduction (1910-39)	336	1,098	1,139	40	2,277
	Pole	4,685	21,481	26,336	346	48,163
	Mature	542	383	248	137	768
	Stream	114	1,048	169	897	2,114
	Total	6,657	28,476	45,154	1,750	75,380
All Workings	Plantation (1945-49)	145	447	1,282	139	1,868
	Cutover (1945-49)	1,661	27,114	180,120	15,926	223,160
	Cutover (1940-44)	1,632	30,821	123,934	895	155,650
	Cutover (1920-39)	886	10,304	14,908	362	25,574
	Reproduction (1910-39)	375	1,104	3,454	40	4,598
	Pole	7,164	46,204	41,601	1,328	89,133
	Mature	547	433	248	155	836
	Stream	234	2,495	286	2,167	4,948
	Total	12,644	118,922	365,833	21,012	505,767

TABLE 6

SUMMARY OF RIBES ERADICATION, 1929-1949
CLEARWATER OPERATION

Working	Eradication Types	Year of Origin	Gross Acres Worked	Man-Days	Ribes	Per Acre		Net Acreage Remaining	
						Man-Days	Ribes	Worked	Unworked
First	Plantation	1945-49	282	541	29,026	1.92	103	282	
	Cutover (4)	1945-49	1,619	1,063	198,157	.66	122	1,619	14,117
	Plantation	1940-44	60	232	134,749	3.97	2,246	60	
	Cutover (5)	1940-44	9,657	12,465	5,335,821	1.29	553	9,657	25,552
	Cutover	1920-39	39,145	40,297	13,660,654	1.03	349	35,322	29,858
	Reproduction	1910-39	71,993	109,096	33,469,252	1.52	465	70,780	3,584
	Pole		31,494	18,418	3,878,037	.58	123	29,849	4,762
	Mature		219,294	99,884	23,422,422	.46	107	153,922	39,373
	Miscellaneous		5,852	3,900	1,700,804	.67	291	5,416	7,819
	Stream (1)		42,536	78,391	14,098,578	1.84	331	42,536	13,492
	Total		421,932	364,287	95,927,500	.86	227	349,443	138,557
Second	Plantation	1945-49	201	287	20,183	1.43	100	201	
	Cutover	1945-49	174	270	27,780	1.55	160	174	
	Plantation	1940-44	60	194	15,587	3.23	260	60	
	Cutover (6)	1940-44	1,688	2,980	320,947	1.77	190	1,688	
	Cutover	1920-39	31,264	30,311	8,256,605	.97	264	31,264	
	Reproduction	1910-39	26,875	42,095	3,791,630	1.57	141	26,799	
	Pole		21,086	11,292	1,247,600	.54	59	20,447	
	Mature		16,333	7,983	815,665	.49	50	14,173	
	Miscellaneous		511	573	371,107	1.12	726	511	
	Stream (2)		23,815	27,080	3,333,043	1.14	140	23,815	
	Total		122,007	123,065	18,200,147	1.01	149	119,132	
Third	Plantation	1945-49	64	20	1,149	.31	18	64	
	Plantation	1940-44	120	122	2,762	1.02	23	120	
	Cutover	1940-44	148	95	6,238	.64	42	148	
	Cutover	1920-39	16,563	15,733	1,142,880	.95	69	16,563	
	Reproduction	1910-39	8,317	10,813	475,959	1.30	57	8,317	
	Pole		7,851	4,383	96,982	.56	12	7,851	
	Mature		542	41	768	.08	1	542	
	Stream (3)		3,548	4,071	412,204	1.15	116	3,548	
	Total		37,153	35,278	2,138,942	.95	58	37,153	
	GRAND TOTAL		581,092	522,630	116,266,589	.90	200	505,728	

Chemical work included above:

Stream				Upland			
	Acres	Man-Days	Gallons Spray		Acres	Man-Days	Gallons Spray
(1)	15,140	31,439	811,448	(4)	210	168	7,535
(2)	5,910	8,256	120,043	(5)	335	371	23,221
(3)	924	1,556	25,467	(6)	68	95	9,787

TABLE 7

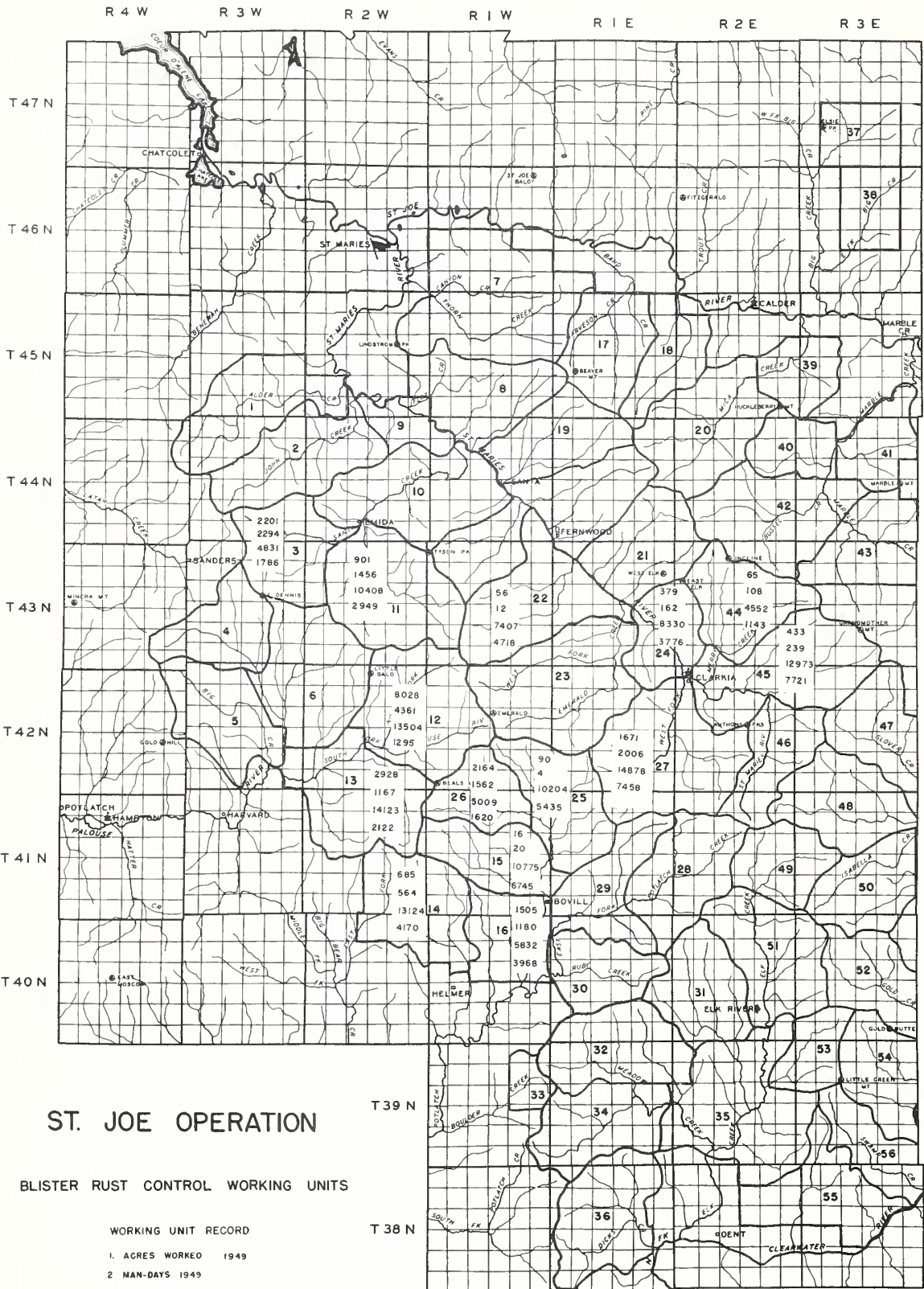
SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1929-1949
CLEARWATER OPERATION

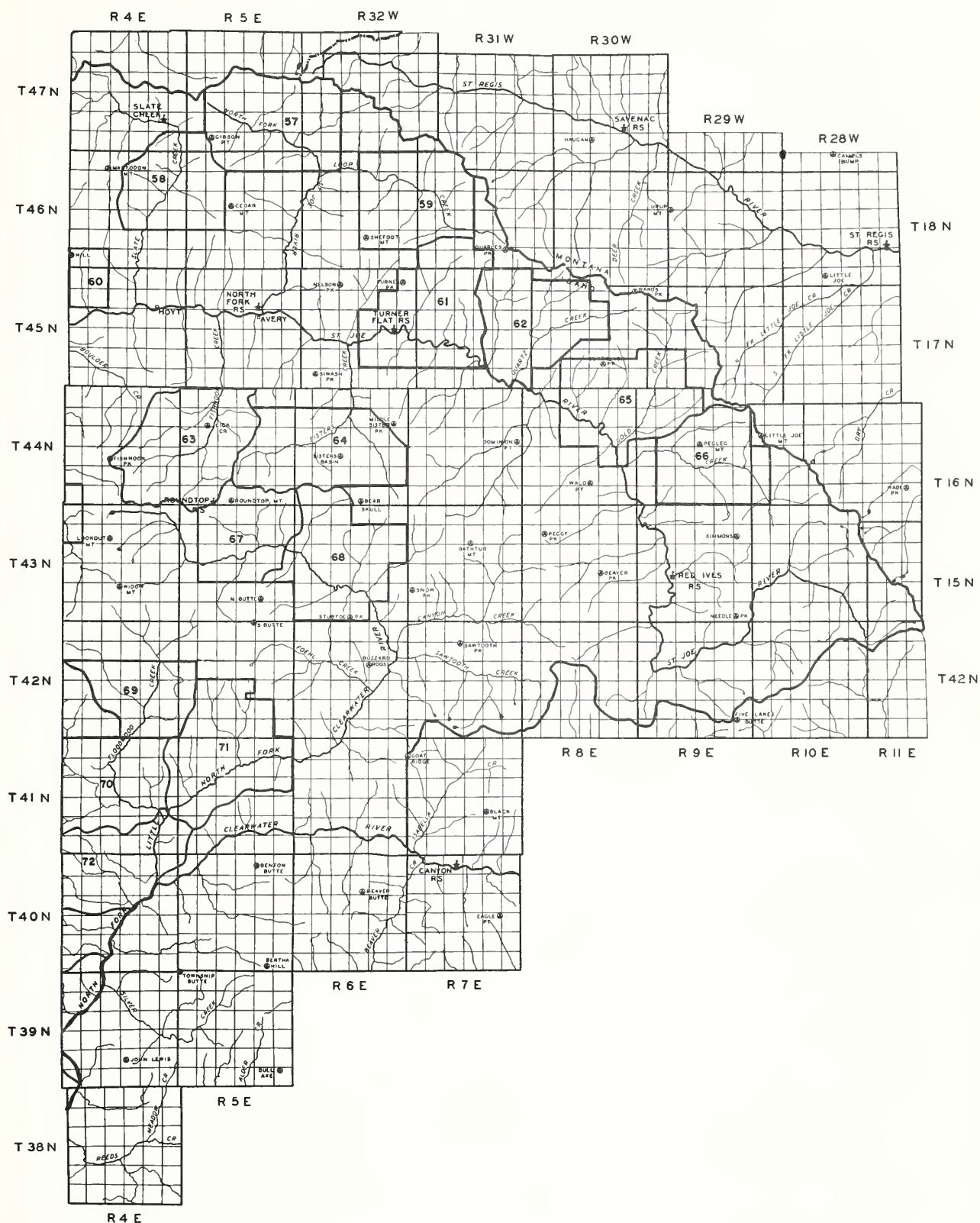
Stats	Class	Gross Acres	Man-Days	Total Ribes	Gallons Spray	Per Acre	
						Man-Days	Ribes
Idaho	EQ-Reg.	4,412	5,273	1,129,228	79,864	1.20	256
	EQ-Coop.	61,573	57,385	7,851,066	168,800	.93	128
	EQ-Emsrg.	133,970	125,277	30,398,093	136,847	.94	227
	EQ-Cont.	40	68	2,774		1.70	69
	FS-Reg.	137,707	123,377	29,748,763	179,378	.90	216
	FS-Emsrg.	55,908	45,382	14,895,022	24,015	.81	266
	CCC	187,482	165,868	32,241,643	408,597	.88	172
	Total	581,092	522,630	116,266,589	997,501	.90	200

TABLE 8

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1929-1949
CLEARWATER OPERATION

State	Ownership	Net Acres in Control Area					
		Acres Worked				Unworked	Total Acres
		First	Second	Third	Total		
Idaho	National Forest	152,925	58,808	16,941	228,674	47,427	200,352
	Public Domain	3,648	708	52	4,408	382	4,030
	Subtotal Federal	156,573	59,516	16,993	233,082	47,809	204,382
	State	58,322	14,949	2,741	76,012	31,936	90,258
	Private	134,548	44,667	17,419	196,634	58,812	193,360
	Subtotal Other	192,870	59,616	20,160	272,646	90,748	283,618
	Total	349,443	119,132	37,153	505,728	138,557	488,000





BLISTER RUST CONTROL, ST. JOE OPERATION, 1949

By

H. J. Hartman, Operation Supervisor

R. F. Thaanum, Forester, U. S. Forest Service

W. F. Painter, Assistant Operation Supervisor

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INTRODUCTION

Blister rust control was continued on the St. Joe operation for the 21st consecutive year. The operation comprises 884,925 acres of western white pine type, of which 504,985 acres are in the St. Joe National Forest and 379,940 acres in the Potlatch Timber Protective Association. At the close of the 1949 field season 477,069 acres had been worked initially, 174,069 acres the second time, and 75,751 acres three or more times.

The working units supporting immature stands have been analyzed to determine their relative white pine producing potential. They were also analyzed to arrive at the blister rust control expenditure required per thousand board feet to carry the stands through to maturity. All funds are being spent on the units which will produce the greatest return per dollar invested. This concentrates nearly all work on the pole and reproduction stands most fully stocked to white pine.

The Bureau of Entomology and Plant Quarantine operated three camps. These camps were located on lands of intermingled ownership in the vicinity of Shea Meadows, Cougar Creek, and Merry Creek. The Forest Service financed and administered seven camps on National Forest lands in the north and south forks of the Palouse River, Willow, Preston, and Mazie Creeks.

Roger F. Thaanum replaced D. J. Moore as Forest Service blister rust staffman in May.

The work season averaged $2\frac{1}{2}$ months per camp. Two-thirds of the workers were college students. The quality of the workers was substantially better than last year. The labor turnover decreased, but was still high. Eight hundred and ten man-days were lost from blister rust work due to fire fighting duty. At the peak of employment, there were 325 employees in the 7 Forest Service camps and 120 in the 3 Bureau camps.

The workers were authorized to work 48 hours per week during the period June through August, weather permitting. They were guaranteed 40 hours per week. The first 8 hours of work lost during the week were rescheduled for Saturday at straight time. The 48-hour work week policy should be continued. It reduces effective man-day costs, increases production, and improves the morale of the workers.

METHODS AND EQUIPMENT

The one-man dragline method of ribes eradication was used in all camps. Men were trained in regular three-man crews under close supervision for the first few days. They were then assigned individually to lanes with a straw boss for

each eight men. In nearly all cases, the lanes were worked uphill. The worker usually laid the draglines in advance of the actual working of the strip.

Some 223 acres of heavy concentrations of ribes on streams and recently logged areas were treated with 2,4,5-T. A Bean power sprayer, knapsack sprayers, and Hi-Fog guns were used to apply the chemical.

Ammonium sulfamate was used extensively by all camps for ribes decapitation work. Each worker carried a supply of chemical on his belt in a rubberized pouch. One ton of dry chemical was used in ribes decapitation work.

The Forest Service awarded 6 ribes eradication contracts totaling 240 acres. The average bid price was \$14.05 per acre. The contract areas represented average to very difficult working conditions and averaged 15 ribes and .96 man-day per acre. Contract work has a very definite place in the control program and will be expanded. It provides an effective method to accomplish more and better work at a minimum cost. Small isolated blocks may be worked without establishing a Government camp. Any type of area may be contracted except those best suited for large scale chemical eradication. Ribes eradication experience provides the bidder with the necessary background to properly evaluate the area on which he plans to bid. Contracts should be 30 to 40 acres in size to attract more bidders and to create competition among bidders. If a contractor does poorly financially on one contract, he may improve his position on the next one.

Areas totaling 1,105 acres have been surveyed for Forest Service contract work and are to be advertised early in 1950.

LOCATION AND DESCRIPTION OF AREAS

All control work was concentrated on the following high priority units:

Upper Santa and Ramskull Creek, Unit No. 3

This unit contains 13,000 acres on which occurs 4,000 acres of excellent white pine pole, reproduction, and plantation in a solid block. The other 9,000 acres in the unit have been recently cutover or are poorly stocked to white pine. All control work on this unit has been directed toward the protection of the 4,000 acres of immature white pine. Most of this has been worked three times and 3,000 acres have been worked down to maintenance standards. The remaining 1,000 acres supports light ribes as a result of a light broadcast burn in 1936. The 1950 control plans include the working of 460 acres of this area by contract. The 1948 disease survey indicated that 19 percent of the Ramskull Creek plantation and 27 percent of the pole stand on Willow Creek were damaged by blister rust. In 1949 all rework was completed for the Willow Creek drainage and the protection zone was extended to the East Dennis lookout. This rework program was started in 1948. The crews of a Forest Service camp worked 2,200 acres which averaged 1.04 man-days and 24 ribes per acre.

Charlie Creek, Unit No. 11

This unit contains 7,680 acres of pole, reproduction, and plantation. Most of this area has been worked twice and is practically free of ribes. In 1949 first working was performed in upper Preston Creek on an area supporting an open pole stand that had been disturbed by fire and logging. An abundance of



W-671

Snow damage in dense 41 to 60 year old white pine pole stand during winter of 1948-49. The opening of these stands and the resulting soil disturbance cause ribes germination.



W-680

Type of areas covered by Bureau crews in 1949. West fork of Potlatch Creek in foreground and Moose Creek in background. Area was clear-cut during 1910 to 1923. Much of the area double-burned. Last major burn in 1923.

ribes were removed to protect the pine in the immediate vicinity and to extend the protective zone of the unit. Forest Service crews worked 900 acres averaging 1.64 man-days and 166 ribes per acre.

In the fall of 1948, 280 acres of unworked brushland on Preston Knob were prepared for broadcast burning in order to eliminate an infection hazard to the Charlie Creek plantation. A satisfactory burn was accomplished in September 1949 on half the area, which portion will be planted in the near future. The unburned portion will be burned in 1950.

Upper Palouse River, Unit No. 12

There is a total of 19,666 acres in this unit, of which 8,740 acres are natural white pine pole 41-60 years of age. This unit supports one of the better blocks of white pine pole on the forest. The remaining 10,926 acres are in a deferred status, most of which is cutover. Previous snow damage to the stands, dredging, and logging caused a large portion of the area to be worked a third time in 1949. The 1949 work area was all placed on post check due to snow damage that occurred during the winter of 1948-49. The crews of the 3 Forest Service camps in this unit worked 8,028 acres which averaged .54 man-day and 17 ribes per acre. All control work on this unit was completed for the present.

Sand Creek, Unit No. 13

This unit contains 10,000 acres of pole 41 to 60 years of age. This excellent block of pole is a continuation of the stand occurring on the east fork of Meadow Creek and Upper Palouse River unit. The 1949 disease survey showed 13 percent of the pole stand damaged by blister rust. The 2,930 acres worked by Forest Service crews averaged .70 man-day and 8 ribes per acre. Extensive snow damage occurred on this unit during the winter of 1948-49. Two additional camp seasons will be required to complete the work on this unit. A portion of Little Sand Creek has been logged and left in a nonreproductive state. The ribes will have to be removed from the logged area in order to protect the remaining stand in this drainage.

Corral Creek, Unit No. 14

Practically all of this unit was selectively logged or clear-cut and broadcast burned in the early twenties. The present stand is a mixed age class. The clear-cut and broadcast burned areas now support a good stand of white pine reproduction with new white pine seedlings still filling in the openings. This area was initially worked in 1936. In 1949, 685 acres of the 6,400 acres in the unit were worked for the second time by the Bureau. The area worked averaged .82 man-day and 24 ribes per acre. No ribes seedlings were found on the area. The 1949 disease survey showed that 32 percent of the pine had been damaged by blister rust. Two camps will complete the work on this unit in 1950.

Hog Meadow, Unit No. 16

Most of this unit was clear-cut and broadcast burned in the early twenties. A good stand of white pine reproduction is present and white pine seedlings are still appearing in the openings. The 1,505 acres worked by Bureau crews in 1949 for the second time, were first worked in 1936. The area averaged .78 man-day and 11 ribes per acre. No ribes seedlings were found. The 1949 disease survey

shows that 25 percent of the stand was damaged by blister rust. One camp-month in 1950 will be required to finish the work on this unit.

Cougar Creek, Unit No. 26

This unit contains approximately 4,200 acres of good white pine reproduction which regenerated on clear-cut lands broadcast burned in 1914 and again in 1923. White pine reproduction is still coming in. The upper limits of this unit are poorly stocked and support a very dense stand of brush which has never been worked. The better stocked portion of the unit was initially worked in 1934 and 1936. In 1949, 2,164 acres were worked for the second time by Bureau crews. The worked area averaged .73 man-day and 7 ribs per acre. No ribs seedlings were found on the area. Work on this unit has been completed for the present.

West Fork of St. Maries River, Unit No. 27

This unit contains 13,000 acres of white pine pole and reproduction. The well stocked reproduction stands regenerated on areas that were broadcast burned between 1912 and 1928 following logging. The unit is potentially the best white pine producing area on the operation. Three workings have placed most of the unit on maintenance. In 1949 the Forest Service worked 1,670 acres which averaged 1.20 man-days and 12 ribs per acre. Stream type, recently cutover areas, and small blocks of upland not on maintenance were reworked. The work on this unit was completed for the next three years.

CHECKING

The procedure for regular and post check as outlined in the 1949 checking manual was applied to all areas checked. A Forest Service checker foreman assisted in the training and direction of all checkers. There were 12 Forest Service and 2 Bureau checkers. Six new assignments were filled by men with several years' ribs eradication experience who showed aptitude and interest for the work.

Inspection of the 1949 season's work plus needed post check information accounted for a high percentage of each checker's time. An analysis of activities indicated 65 percent of the total time was given to regular check, 25 percent to post check, and 10 percent to other assignments.

A total of 36,930 acres was checked: 21,120 acres were the 1949 season's eradication work area, and 15,810 acres were post check and maintenance areas.

The cost for regular and post check was 40¢ per acre.

CONTROL STATUS

There are 161,300 acres of maintenance on the operation. This total includes 5,500 acres which were added as a result of the 1949 ribs eradication and post check. There were 1,200 acres of maintenance which reverted to a rework status due to logging in 1949. An additional 8,300 acres of maintenance in pole type were reclassified to a post check status due to soil disturbances resulting from snow damage and other natural causes. Inspections by a post check will be necessary to determine the seedling survival within these areas.

The logging of mature stands continues to add more cutover acreage each year. To date, no large scale program on any cutover area has been possible in view of available funds.

SURVEYS

The survey to determine blister rust damage and the stocking in pole and reproduction stands of western white pine was continued to gain additional data for unit analysis and area classification. Six two-man crews carried on the survey work throughout the 1949 field season. The project was financed from Forest Service funds and a forest officer was chief of party. The Bureau provided the technical supervision. The survey was extensive in order to obtain an over-all picture of the disease conditions. Reproduction stands were only examined when the extent of damage was not known and in units where the advisability of control work was questionable.

The 269 miles of strip were run at the rate of 46 chains per man-day. Areas in 39 of the 72 units on the operation were examined. An analysis of data revealed that most young, unprotected stands were nearly 100 percent damaged, as was the case in the Red Ives region and Crystal Creek.

A field examination was made in September 1949 of the 120-year-old white pine stand on Simmons Creek near the mouth of Dolly Creek. Numerous ribs of all local species were present. Indications are that some loss will take place in this unprotected stand within 12 years. Multiple branch cankers and several dead tops were observed.

Results of the 1949 disease survey are briefed in the following tabulation:

Drainage	Percent Quadrats Damaged	Drainage	Percent Quadrats Damaged
Corral Creek	32	Cameron Creek	40
Hog Meadows Creek	25	Butterfield-Oviat Creek	32
Flewsie Creek	50	Round-Long Meadow Creek	46
John Creek	20	Shattuck-Squaw Creek	48
W. Fk. Merry Creek	46	Cloverleaf-Bull Run Creek	52
Hatten Creek Plantation	6	S. Fk. Palouse River	25
Bussel-Marble Creek	52	N. Fk. Palouse River	29
Renfro Creek	50	Fry Creek	13
Moose Creek	20	Big Sand Creek	13
Cougar Creek	44	W. Fk. Charlie Creek	11

Pole Blight Areas

During the 1949 field season nearly all large stands of white pine pole on the operation were inspected to obtain additional blister rust control information. In the course of these surveys, no new pole blight areas were observed by blister rust control employees. An extensive aerial and ground survey made by the Division of Forest Pathology discovered pole blight on Dago and lower Mica Creek and along the St. Joe River near the mouth of Marble Creek. The west fork of

Emerald Creek pole blight area still represents the southern known limits of this disease. No pole blight has been discovered on lands of the Potlatch Timber Protective Association.

Snow and Frost Damage

The winter of 1948-49 was one of the most severe ever recorded in north Idaho. Very heavy snowfall along with temperatures from 38 to 50 degrees below zero and other unusual weather factors caused widespread damage to the reproduction and pole stands on the operation. Frost damage was very heavy in reproduction stands. However, the damage was confined to the first 2 chains of reproduction occurring along the edges of streams and meadows. A large portion of the damaged trees will recover while others are dead or will be badly deformed.

Snow damage in the dense 41- to 60-year-old pole stands was the most destructive and extensive on record. The damage, with little regard for species or exposure, was general throughout most dense pole stands. The opening of these stands and the resulting soil disturbance will cause ribes germination. Additional ribes eradication will be required on these areas. This damage occurred most extensively in the Palouse and St. Maries River drainages.

STATEMENT OF EXPENDITURES AND COSTS

The statement of expenditures is shown in the following table:

TABLE 1

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1949 ST. JOE OPERATION

Item	Bureau of Entomology & Plant Quarantine					Forest Service BLR-4	Total
	BLR-1-4	Cooperative Control			Total		
		BLR-3-4	Federal State & Private	Total			
Contract ribes erad.						\$ 4,434	\$ 4,434
Salary perm. men	\$15,883	\$ 2,538		\$ 2,538	\$18,421	10,639	29,060
Salary temp. men		7,795	\$ 903	8,698	8,698	21,773	30,471
Wages temp. laborers	150	27,411	10,799	38,210	38,360	159,702	198,062
Subsistence supplies	2,840	4,813		4,813	7,653	37,349	45,002
Equipment	231	49		49	280	8,500	8,780
Travel and transp.	1,465	710		710	2,175	5,351	7,526
Other expenses	2,115	1,157		1,157	3,272	13,436	16,708
Total	\$22,684	\$44,473	\$11,702	\$56,175	\$78,859	\$261,184	\$340,043

TABLE 2

SUMMARY OF RIBES ERADICATION, 1949
ST. JOE OPERATION

Working	Eradication Type	Year of Origin	Acres	Man-Days	Ribes	Per Acre	
						Man-Days	Ribes
First	Cutover (3)	1940-44	416	477	76,985	1.15	185
	Reproduction	1910-39	176	255	34,666	1.45	197
	Pole		684	1,300	99,692	1.90	146
	Stream (1)		235	314	40,195	1.34	171
	Total		1,511	2,346	251,538	1.55	166
Second	Cutover	1940-44	154	166	5,940	1.08	39
	Reproduction	1910-39	4,614	3,537	60,188	.77	13
	Pole		2,851	1,069	24,295	.37	9
	Stream		45	77	5,076	1.71	113
	Total		7,664	4,849	95,499	.63	12
Third	Cutover	1920-39	129	101	1,432	.78	11
	Reproduction	1910-39	1,889	2,256	26,467	1.19	14
	Pole		8,427	4,184	121,936	.50	14
	Mature		200	114	1,477	.57	7
	Stream (2)		1,302	1,305	48,488	1.00	37
	Total		11,947	7,960	199,800	.67	17
GRAND TOTAL			21,122	15,155	546,837	.72	26

Chemical work included above:

Stream				Upland			
	Acres	Man-Days	Gallons Spray		Acres	Man-Days	Gallons Spray
(1)	113	137	2,939	(3)	96	60	5,289
(2)	14	9	46				

TABLE 3

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1949
ST. JOE OPERATION

State	Working	Class	Acres	Man-Days	Ribes	Gallons Spray	Per Acre	
							Man-Days	Ribes
Idaho	First	FS-Reg.	1,511	2,346	251,538	8,228	1.55	166
		EQ-Coop.	4,150	3,137	46,743		.76	11
	Second	FS-Reg.	3,514	1,712	48,756		.49	14
		Total	7,664	4,849	95,499		.63	12
	Third	EQ-Coop.	1,243	734	16,175	40	.59	13
		FS-Reg.	10,463	6,993	179,975	6	.68	17
		FS-Cont.	241	233	3,650		.97	15
		Total	11,947	7,960	199,800	46	.67	17
	All Workings	EQ-Coop.	5,393	3,871	62,918	40	.72	12
		FS-Reg.	15,488	11,051	480,269	8,234	.71	31
		FS-Cont.	241	233	3,650		.97	15
		Total	21,122	15,155	546,837	8,274	.72	26

TABLE 4
OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1949
ST. JOE OPERATION

State	Working	Acres Worked																GRAND TOTAL
		By Forest Service					By Bureau of Entomology and Plant Quarantine					Total Federal		Total Other				
		National Forest	Public Domain	State	Private	Total	National Forest	Public Domain	State	Private	Total	National Forest	Public Domain	State	Private	Total		
Idaho	First	1,041			470	1,511						1,041			470	470	1,511	
	Second	1,891		426	1,197	3,514	2,057		1,439	654	4,150	3,948		1,865	1,851	3,716	7,664	
	Third	6,989	214	54	3,447	10,704	219	3	110	911	1,243	7,208	217	164	4,358	4,522	11,947	
	Total	9,921	214	480	5,114	15,729	2,276	3	1,549	1,565	5,393	12,197	217	2,029	6,679	8,708	21,122	

TABLE 5
RIBES SPECIES ERADICATED, 1949
ST. JOE OPERATION

Working	Eradication Type	Acres	Ribes Species				Total Ribes
			Ribes lacustre	Ribes vicosissimum	Ribes petiolare	Ribes inermis	
First	Cutover (1940-44)	416	66,531	10,454			76,985
	Reproduction (1910-39)	176	27,074	7,592			34,666
	Pole	684	96,279	3,413			99,692
	Stream	235	39,167	1,028			40,195
	Total	1,511	229,051	22,487			251,538
Second	Cutover (1940-44)	154	3,424	2,516			5,940
	Reproduction (1910-39)	4,614	22,361	37,806		21	60,188
	Pole	2,851	14,914	9,381			24,295
	Stream	45	5,058	18			5,076
	Total	7,664	45,757	49,721		21	95,499
Third	Cutover (1920-39)	129	245	1,187			1,432
	Reproduction (1910-39)	1,889	11,476	14,765	226		26,467
	Pole	8,427	51,665	70,213	58		121,936
	Mature	200	1,315	162			1,477
	Stream	1,302	41,978	602	5,219	689	48,488
All Workings	Total	11,947	106,679	86,929	5,503	689	199,800
	Cutover (1940-44)	570	69,955	12,970			82,925
	Cutover (1920-39)	129	245	1,187			1,432
	Reproduction (1910-39)	6,679	60,911	60,163	226	21	121,321
	Pole	11,962	162,858	83,007	58		245,923
All Workings	Mature	200	1,315	162			1,477
	Stream	1,582	86,203	1,648	5,219	689	93,759
	Total	21,122	381,487	159,137	5,503	710	546,837

TABLE 6

SUMMARY OF RIBES ERADICATION 1929-1949
ST. JOE OPERATION

Working	Eradication Type	Year of Origin	Gross Acres Worked	Man-Days	Ribes	Per Acre		Net Acreage Remaining	
						Man-Days	Ribes	Worked	Unworked
First	Cutover	1945-49							9,282
	Plantation	1940-44	2,209	4,763	1,092,843	2.16	495	2,209	
	Cutover	1940-44	1,070	1,608	131,044	1.50	122	1,070	34,042
	Cutover (4)	1920-39	16,498	11,543	3,604,682	.70	218	16,498	156,691
	Reproduction	1910-39	218,195	241,568	81,203,768	1.11	372	217,988	104,460
	Pole		87,522	34,382	7,879,747	.39	90	87,237	17,726
	Mature		177,162	68,756	17,998,538	.39	102	113,588	85,655
	Miscellaneous		2,652	2,297	767,429	.87	289		2,652
	Stream (1)		35,807	97,710	23,434,331	2.73	654	35,807	
	Total		541,115	462,627	136,112,382	.85	252	477,069	407,856
Second	Plantation	1940-44	1,198	1,207	57,827	1.01	48		1,198
	Cutover	1940-44	154	166	5,940	1.08	39		154
	Cutover	1920-39	7,684	8,519	549,431	1.11	72		7,684
	Reproduction (5)	1910-39	90,973	106,496	9,512,700	1.17	105	90,973	
	Pole		51,945	27,620	1,488,179	.53	29	51,762	
	Mature		9,478	7,254	837,751	.77	88	8,568	
	Miscellaneous		540	730	34,169	1.35	63		540
	Stream (2)		13,190	28,701	5,247,068	2.18	398	13,190	
	Total		175,162	180,693	17,733,065	1.03	101	174,069	
Third	Plantation	1940-44	518	929	18,214	1.79	35		518
	Cutover	1920-39	6,472	4,498	84,526	.69	13		6,472
	Reproduction	1910-39	35,497	55,341	1,093,249	1.56	31	35,497	
	Pole		20,467	11,868	251,690	.58	12	20,467	
	Mature		370	439	39,519	1.19	107		370
	Miscellaneous		49	5	4	1.10	1		49
	Stream (3)		12,378	18,995	1,902,527	1.53	154	12,378	
	Total		75,751	92,075	3,389,729	1.22	45	75,751	
GRAND TOTAL			792,028	735,395	157,235,176	.93	199	726,889	

Chemical work included above:

Stream			Upland		
Acres	Man-Days	Gallons Spray	Acres	Man-Days	Gallons Spray
(1) 7,607	22,041	675,745	(4) 96	60	5,289
(2) 3,327	4,858	113,162	(5) 21	78	137
(3) 3,260	3,580	28,616			

TABLE 7

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1929-1949
ST. JOE OPERATION

State	Class	Gross Acres	Man-Days	Total Ribes	Gallons Spray	Per Acre	
						Man-Days	Ribes
Idaho	EQ-Coop.	65,768	55,308	5,337,354	65,121	.84	81
	EQ-Emerg.	234,519	157,898	43,593,387	77,088	.67	186
	FS-Reg.	228,262	251,462	36,076,686	330,558	1.10	158
	FS-Cont.	256	244	4,340		.95	17
	FS-Emerg.	70,981	45,138	15,333,106	101,476	.64	216
	CCC	192,242	225,345	56,890,303	248,706	1.17	296
	Total	792,028	735,395	157,235,176	822,949	.93	199

TABLE 8

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1929-1949
ST. JOE OPERATION

State	Ownership	Net Acres in Control Area					
		Acres Worked				Acres Unworked	Total Acres
		First	Second	Third	Total		
Idaho	National Forest	216,790	95,562	42,543	354,895	96,911	313,701
	Public Domain	12,458	5,411	2,866	20,735	12,637	25,095
	Subtotal Federal	229,248	100,973	45,409	375,630	109,548	338,796
	State	56,371	23,674	6,961	87,006	58,898	115,269
	Private	191,450	49,422	23,381	264,253	239,410	430,860
	Subtotal Other	247,821	73,096	30,342	351,259	298,308	546,129
	Total	477,069	174,069	75,751	726,889	407,856	884,925

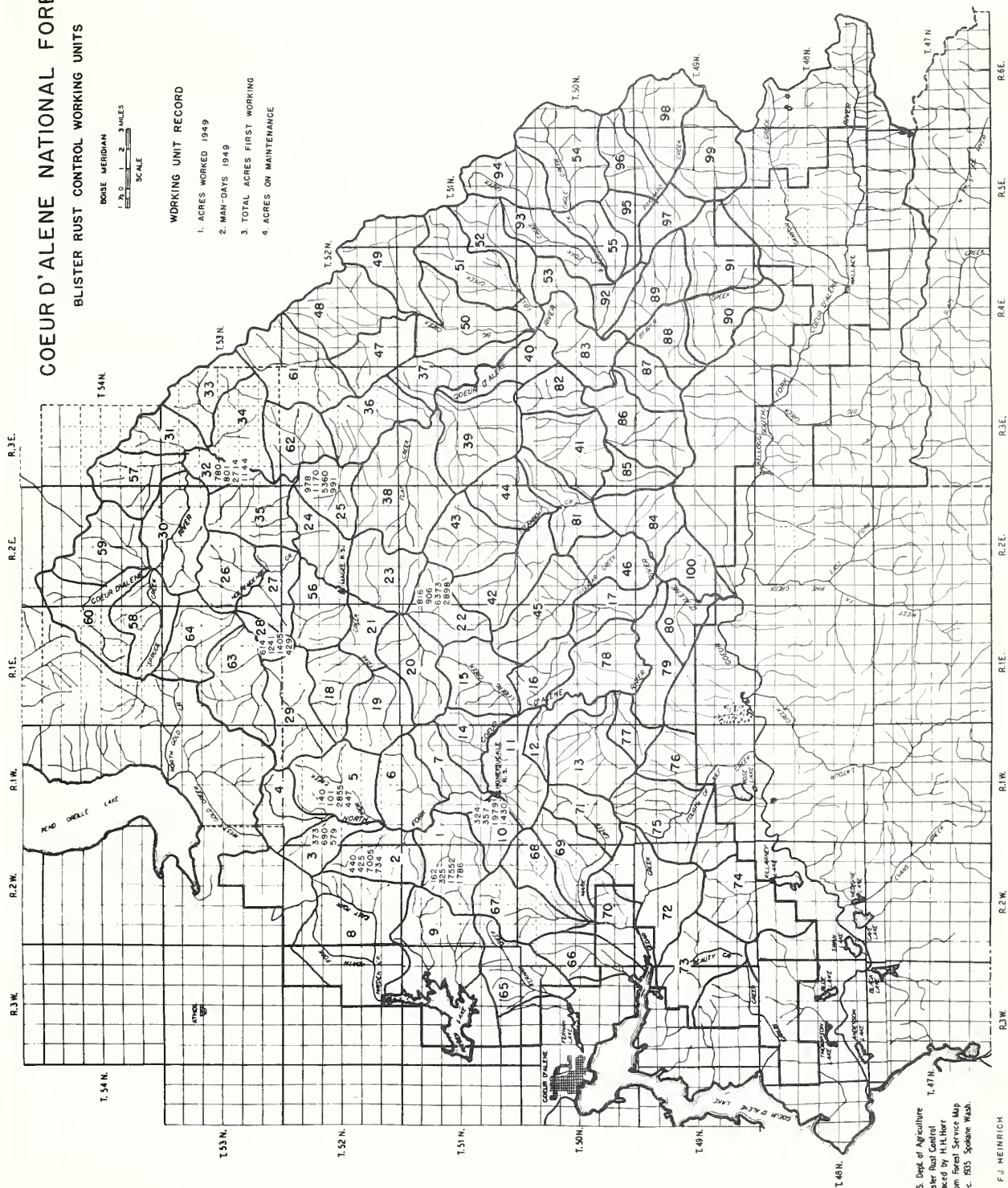
COEUR D'ALENE NATIONAL FOREST

BLISTER RUST CONTROL WORKING UNITS



WORKING UNIT RECORD

1. ACRES WORKED 1949
2. MAN-DAYS 1949
3. TOTAL ACRES FIRST WORKING
4. ACRES ON MAINTENANCE



U.S. Dept. of Agriculture
Blister Rust Control
Task Force
From Forest Service Map
Dec. 1935 Spokane Wash.

F. J. HEINRICH
ANNUAL REPORT 1949

BLISTER RUST CONTROL, COEUR D'ALENE OPERATION, 1949

By

F. J. Heinrich, Operation Supervisor, Bureau of Entomology and Plant Quarantine
C. J. Pederson, Forest Officer, U. S. Forest Service

INTRODUCTION

The Coeur d'Alene blister rust control area is divided into 100 working units comprising 383,000 acres of white pine land. These units range from 650 to 14,000 acres in size. Tentatively, 22 units totaling 130,000 acres supporting excellent white pine reproduction and pole stands have been placed in the highest priority group. It is on these selected stands that present control efforts are being concentrated. Many of the remaining units are economically worthy of protection, but will not receive consideration until higher priority units have been protected.

Field work was continued during the past season with 7 regular camps and 21 contract areas. Personnel were well trained and did satisfactory work. Due to the small program, accomplishments were not commensurate with the over-all forest program needs. Chemicals were used extensively in the eradication of stream type on all work areas.

LOCATION AND DESCRIPTION OF AREAS

Hudlow Camp, 33-Man, Working Units Nos. 2, 3, and 5

Third working was completed on 373 acres of white pine reproduction on Tom Lavin Creek, Unit No. 3. This area logged in 1935 supports a well stocked vigorous stand, established by natural seeding and 1941 fill-in planting. This area is from 20 to 40 chains in width and 150 chains in length. A protective zone has been established in the bordering logged over area. With the realignment of the unit boundary, little future work will be needed to carry the established stands through to maturity.

Spot working was done in the 2,600 acres of pole type in the Hudlow Unit No. 2. One more season's work remains before the established young stands will be completely protected. Pole blight is prevalent in this unit causing considerable damage to the pole size white pine trees. Future rehabilitation and blister rust work will be needed on the west and middle forks of Hudlow Creek where logging operations are now in process.

A three-man crew using a mobile power sprayer continued with the stream type spray work on Iron Creek which was started in 1948. Ammate was used early in the season until the supply was exhausted, then 2,4,5-T was used for the remainder of the season. Work plans call for the completion of spray work on Iron Creek in 1950. It is important that the ribes be removed from the stream type in order to prevent damage to the adjacent Class I pole stand on Colt Mt.

Lone Cabin Camp, 33-Man, Working Units Nos. 1 and 10

Work was performed in Burnt Cabin and Lost Mine Creek drainages in Unit No. 1. This was a continuation of the work started in 1948 and completes the current work needed in these reproduction and pole stands.

Second working was completed on 210 acres and first working on 100 acres in the pole stand in upper Deception Creek, Unit 10. This unit not only consists of excellent pine stands, but is also the Deception Creek Experimental Forest which comprises 3,500 acres. One-third of this area is now on maintenance. Another season's work will be needed to bring the work in this unit up to schedule.

On portions of this area, there was considerable recent blowdown and snow damage to the pine. These areas should be inspected in 1951 to check on ribes regeneration.

Riley Creek Camp, 60-Man, Working Unit No. 22

Control work was continued on the 6,000-acre block of reproduction and pole stands in the Tepee Creek Unit. Although over 2,000 acres are classified as being on maintenance, ribes eradication work is far behind schedule. In 1948, second working was begun in this unit which received initial work in 1934. Blister rust has damaged 16 percent of the stand. Regardless of infection losses, the area still remains well stocked. Completion of the work planned during the next 2 years will give complete protection to the present established stands.

The 270-acre mature stand in the head of Riley Creek is in the process of being cut. Management plans call for silvicultural practices that will reduce to the fullest extent possible ribes potentials which might become a hazard to adjacent pole stands.

Nowhere Camp, 30-Man; Magee Camp, 10-Man; Working Unit No. 25

Work within this 5,000-acre unit is nearing completion. This area supports excellent young reproduction and extensive plantations of 1934 and 1941 origin. Apparently ribes germination has ceased on nearly all areas within this unit. Results of an intensive flanker check showed ribes on only a small portion of the 1941 plantation which was last worked in 1945.

Crewmen from the Nowhere Camp worked in President, Vice President, and Nowhere Creek drainages. The Magee camp worked only on chemical eradication. One hundred and eighty acres supporting heavy ribes population were sprayed with 2,4,5-T chemical solution. This area was located in the heads of Senator, New Deal, and Molly Creek drainages and presented a hazard to the extensive plantations in these drainages. Chemical was applied from Hi-Fog units, mobile power, and knapsack sprayers.

As a result of proper work scheduling and past efficient ribes eradication, blister rust damage to the pine is negligible.

Independence Creek Camp, 33-Man, Working Units Nos. 28 and 63

During the past season, an adjustment was made in these two working unit boundaries. Working Unit No. 28 now consists of a 2,000-acre block of white pine largely plantations of 1926, 1933, and 1941 origin. Fill-in planting has also been done in recent years. Field work this year was a continuation of that started in 1948. In addition to the 150 acres of upland worked, 73 acres of first working stream type were completed on Independence Creek. These heavy Ribes inerme and R. lacustre concentrations were treated with 2,4,5-T. All three types of chemical equipment were used.

Necessary work on this unit will be completed by ribes eradication contractors next year. Blister rust damage averages 10 percent.

Jordan Creek Camp, 33-Man, Working Unit No. 32

Rework was completed on 645 acres of 1924 Class I plantation and natural reproduction lying north and west of East Cathedral Lookout. Stream type along the Coeur d'Alene River comprising 60 acres was treated with 2,4,5-T.

Control work is nearing completion on this 2,700-acre unit which consists largely of plantations of 1923-24 origin. Future work will be needed on a 200-acre block located in the west portion of the unit where dense brush and numerous ribes have resulted in difficult working conditions.

This is an outstanding unit where very little blister rust damage has occurred.

WORKING METHODS

A training school for supervisory personnel was held at Hudlow during the first week in June. Complete instructions were given on all phases of ribes eradication work. All crewmen were given thorough training at their respective camps.

The one-man dragline method was used on all camps. Results obtained from the use of this method were highly satisfactory.

A change was made from the use of Ammate to 2,4,5-T in the treatment of stream type ribes. Ammate which was used in 1948 proved to be unsatisfactory. Some of the ribes which appeared to be dead in the fall of 1948 resprouted in the spring of 1949. It appears that 2,4,5-T will give excellent results on all upland and stream type ribes on the forest. However, final results will not be known until the spring of 1950.

CONTRACT WORK

The contract program for ribes eradication was started July 1 and by early August, 22 areas had been posted for bid. Bid prices in one case were rejected as being too high. This unit was readvertised and a more favorable price accepted. Another contract was canceled due to the contractor's inability to begin work by the stipulated deadline. Eighteen of the contracts were completed. Extension of time to June 30, 1950, was granted on three. Bid prices ranged from \$10.50 to \$22.90 per acre, the average being \$14.91. Administrative costs were \$2 per acre.

Contractors completed 962 acres in the 10- to 20-year age class. Twenty-eight ribes were removed per acre at .88 man-day. Workers were required to use the dragline method and reduce the ribes population to one or less per acre, with not more than 5 feet of live stem. The interest with which workers have accepted the contract idea indicates the possibility of a larger contract program in 1950.

CONTROL STATUS

At the close of the 1949 field season, 96,000 acres or 25 percent of the work area within the control boundary has been placed on maintenance. This protected area comprises 15,000 acres of reproduction, 29,000 acres of pole, and 52,000 acres of mature type. Approximately 50,000 acres have been brought to near maintenance standard needing only a small amount of rework before being adequately protected. The net increase in maintenance has been small during the past few years as area removed from maintenance due to cutting nearly offsets acreage gained in the protection of younger age class stands.

If present high priority units are to be carried through to maturity, an increased program is mandatory. The past season's work accomplishments were only 35 percent adequate. When the working units have been completely analyzed, it will be possible to show the amount of work done and the man-days remaining to give complete protection to each unit. It is planned to show this information in the 1950 annual report.

CHECKING AND SURVEYS

A training school for 10 checkers was held at Hudlow during the last week in June. All checking personnel were capable with nine having previous checking experience. On areas worked using the dragline method, all work lots were promptly checked. The checker ran an 8-foot wide meandering course between the boundaries of the $2\frac{1}{2}$ -chain wide lanes and each strip was tied in at 5-chain intervals. This checking method worked satisfactorily as the checker could concentrate on searching without the interference of pacing and compass work. When no regular check was needed, checking personnel laid crew lanes or ran post checks.

A post check was conducted on 9,172 acres of white pine reproduction and plantations. Information was obtained to show the effectiveness of past eradication work and to segregate areas upon which future work will be needed.

POST CHECK 1949

<u>Working Unit Number</u>	<u>Name</u>	<u>Drainage</u>	<u>Acres Checked</u>
27	Owl and Independence Creeks	Lower Independence Creek	3,132
22	Riley Creek	Short Creek	621
36	Nowhere	Brett, Senator, and Nowhere Creeks	2,951
10	Deception	Coffee and Sands Creeks	832
2	Hudlow	East Fork Hudlow Creek	53
2	Hudlow	West Fork Hudlow Creek	687
2	Hudlow	Nicholas Creek	896
Total			9,172

Pine disease and stocking surveys to determine the present blister rust damage and stocking by tree species were continued again this year. All high priority reproduction and pole areas have now been covered, some rather extensively. Next year additional strips will be run on doubtful areas and a few outlying unsurveyed areas included. This information is necessary in order to analyze the areas in each unit to determine potential pine values at maturity and priority of work areas.

During the past season, 12,273 chains of survey strips were run in the following drainages:

WHITE PINE DISEASE AND STOCKING SURVEYS, 1949

<u>Working Unit Number</u>	<u>Drainage</u>	<u>Chains Survey Strip</u>
1	Burnt Cabin and Lost Mine Creeks	220
3	Tom Lavin, Lewelling, and Squirrel Creeks	1,130
5	Iron and Moose Creeks	30
6	Barney, Scribe, and Argument Creeks	150
8	Hayden and E. Fork Hayden Creeks	310
10	Deception and Coffee Creeks	300
11	Knight Creek	100
12	Coeur d'Alene River	210
29	Goose Creek	140
31	Alden, Cabin, Falls, and Jordan Creeks	720
32	Cathedral, Ethel, Tsuga Creeks, and Coeur d'Alene River	940
34	Lost Fork Jordan and Calamity Creeks	1,500
35	West Elk Creek	90
51	Lost Creek	140
52	East Fork Lost Creek	210
56	Bear, W. Fork Bear, and Evans Creeks	315
57		
59	Buckskin Creek and Coeur d'Alene River	450
63	Declaration, Surprise, and Ermine Creeks	1,630
67	Stella Creek	710
75	Mill, Reserve, and Fourth of July Creeks	370
77	Gimlet Creek	640
78	Little Tepee Creek and Little No. Fk. Coeur d'Alene River	310
86	Graham, E. Fk. Graham, and Deceitful Creeks	194
88	White, Scott, Missouri, and Rock Creeks	590
90	Dudley and Ferguson Creeks	340
91	Pony and Unknown Creeks	170
92	Prichard Creek	80
57	Deer, Blacktail, and Whitetail Creeks	248
Total		12,237

STATEMENT OF EXPENDITURES AND COSTS

The statement of expenditures is shown in the following table.

TABLE 1

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1949 COEUR D'ALENE OPERATION

Item	Bureau of Entomology and Plant Quarantine	Forest Service	Total
	BLR-1-4	BLR-4	
Contract ribes erad.		\$ 14,089	\$ 14,089
Salary perm. men	\$4,618	11,041	15,659
Salary temp. men		13,996	13,996
Wages temp. labs.	60	88,463	88,523
Subs. supplies		27,335	27,335
Equipment	92	6,071	6,163
Travel and transp.	318	8,404	8,722
Other expenses	449	7,967	8,416
Total	\$5,537	\$177,366	\$182,903

TABLE 2

SUMMARY OF RIBES ERADICATION, 1949
COEUR D'ALENE OPERATION

Working	Eradication Type	Year of Origin	Acres	Man-Days	Ribes	Per Acre	
						Man-Days	Ribes
First	Reproduction	1910-39	50	76	1,017	1.52	20
	Pole		100	97	2,729	.97	27
	Stream (1)		73	462	37,100	6.33	508
	Total		223	635	40,846	2.85	183
Second	Plantation	1945-49	50	34	806	.68	16
	Plantation	1940-44	364	310	20,011	.85	55
	Reproduction	1910-39	492	936	71,509	1.90	145
	Pole		992	1,055	22,759	1.06	23
	Stream (2)		220	310	17,190	1.41	78
	Total		2,118	2,645	132,275	1.25	62
Third	Plantation	1940-44	24	35	707	1.46	29
	Cutover	1920-39	130	289	7,924	2.22	61
	Reproduction	1910-39	1,925	2,139	30,124	1.11	16
	Pole		75	33	538	.44	7
	Stream (3)		132	240	30,010	1.82	227
	Total		2,286	2,736	69,303	1.20	30
GRAND TOTAL			4,627	6,016	242,424	1.30	52

Chemical work included above:

	Gallons		
	Acres	Man-Days	Spray
(1)	73	462	3,710
(2)	220	310	2,929
(3)	132	240	2,961

TABLE 3

RIBES SPECIES ERADICATED, 1949
COEUR D'ALENE OPERATION

Working	Eradication Type	Acres	Ribes Species			Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes inerme	
First	Reproduction (1910-39)	50	1,017			1,017
	Pole	100	2,593	136		2,729
	Stream	73	18,550		18,550	37,100
	Total	223	22,160	136	18,550	40,846
Second	Plantation (1945-49)	50	637	169		806
	Plantation (1940-44)	364	13,390	6,621		20,011
	Reproduction (1910-39)	492	60,881	10,628		71,509
	Pole	992	22,304	455		22,759
	Stream	220	17,190			17,190
	Total	2,118	114,402	17,873		132,275
Third	Plantation (1940-44)	24	707			707
	Cutover (1920-39)	130	7,528	396		7,924
	Reproduction (1910-39)	1,925	24,646	5,478		30,124
	Pole	75	537	1		538
	Stream	132	30,010			30,010
	Total	2,286	63,428	5,875		69,303
All Workings	Plantation (1945-49)	50	637	169		806
	Plantation (1940-44)	388	14,097	6,621		20,718
	Cutover (1920-39)	130	7,528	396		7,924
	Reproduction (1910-39)	2,467	86,544	16,106		102,650
	Pole	1,167	25,434	592		26,026
	Stream	425	65,750		18,550	84,300
Total		4,627	199,990	23,884	18,550	242,424

TABLE 4
SUMMARY OF RIBES ERADICATION, 1927-1949
COEUR D'ALENE OPERATION

Working	Eradication Type	Year of Origin	Gross Acres Worked	Man-Days	Ribes	Per Acre		Net Acreage Remaining	
						Man-Days	Ribes	Worked	Unworked
First	Plantation	1945-49	968	578	33,013	.60	34	968	
	Burn	1940-44	716	351	53,652	.49	75	716	
	Plantation	1940-44	992	1,920	465,201	1.94	469	992	227
	Cutover	1940-44	632	508	64,145	.80	101	632	10,136
	Cutover	1920-39	16,575	21,885	5,424,939	1.32	327	16,575	19,034
	Reproduction	1910-39	90,918	140,303	20,738,871	1.54	228	89,095	9,584
	Pole		65,993	31,376	4,485,334	.48	68	65,257	9,438
	Mature		141,127	87,756	13,801,904	.62	98	123,110	7,359
	Miscellaneous		13,333	16,695	2,965,945	1.25	222	12,909	304
	Stream (1)		14,982	58,506	11,883,182	3.91	793	14,874	2,541
	Total		346,236	359,878	59,916,186	1.04	173	325,128	58,623
Second	Plantation	1945-49	50	34	806	.63	16	50	
	Plantation	1940-44	982	1,839	150,971	1.87	154	982	
	Cutover	1940-44	34	18	241	.53	7	34	
	Cutover	1920-39	9,452	13,447	1,975,736	1.42	209	9,452	
	Reproduction	1910-39	23,922	36,926	2,131,258	1.54	89	23,189	
	Pole		6,592	5,063	528,948	.77	80	6,592	
	Mature		10,363	8,266	823,509	.80	79	10,063	
	Miscellaneous		1,585	2,963	358,052	1.87	226	1,585	
	Stream (2)		8,368	15,417	1,658,754	1.84	198	8,260	
	Total		61,348	83,973	7,628,275	1.37	124	60,207	
Third	Plantation	1940-44	918	1,347	63,978	1.47	70	918	
	Cutover	1920-39	5,023	9,424	449,654	1.88	90	5,023	
	Reproduction	1910-39	7,403	10,548	349,147	1.42	47	6,814	
	Pole		1,812	1,594	80,411	.88	44	1,812	
	Mature		2,008	1,477	83,852	.74	42	2,008	
	Miscellaneous		61	72	3,569	1.18	59	61	
	Stream (3)		1,864	3,262	180,746	1.75	97	1,846	
	Total		19,089	27,724	1,211,357	1.45	63	18,482	
	GRAND TOTAL		426,673	471,575	68,755,818	1.11	161	403,817	

Chemical work included above:

	Acres	Man-Days	Gallons Spray
(1)	107	734	7,006
(2)	565	1,130	13,721
(3)	227	447	3,833

TABLE 5
SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1927-1949
COEUR D'ALENE OPERATION

State	Class	Acres	Man-Days	Ribes	Gallons Spray	Per Acre	
						Man-Days	Ribes
Idaho	EQ-Reg.	25,776	8,351	2,846,383		.32	110
	EQ-Emerg.	41,039	35,541	6,589,217		.87	161
	FS-Reg.	98,833	119,860	15,520,800	24,560	1.21	157
	FS-Emerg.	111,711	86,897	17,620,173		.78	158
	FS-Cont.	1,043	924	33,786		.89	32
	CCC	148,271	220,002	26,145,459		1.48	176
	Total	426,673	471,575	68,755,818	24,560	1.11	161

TABLE 6
OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1927-1949
COEUR D'ALENE OPERATION

State	Ownership	Net Acres in Control Area					
		Acres Worked				Acres Unworked	Total Acres
		First	Second	Third	Total		
Idaho	National Forest	308,984	57,854	18,353	385,191	51,672	360,656
	State	5,427	440	45	5,912	711	6,138
	Private	10,717	1,913	84	12,714	6,240	16,957
	Subtotal Other	16,144	2,353	129	18,626	6,951	23,095
	Total	325,128	60,207	18,482	403,817	58,623	383,751

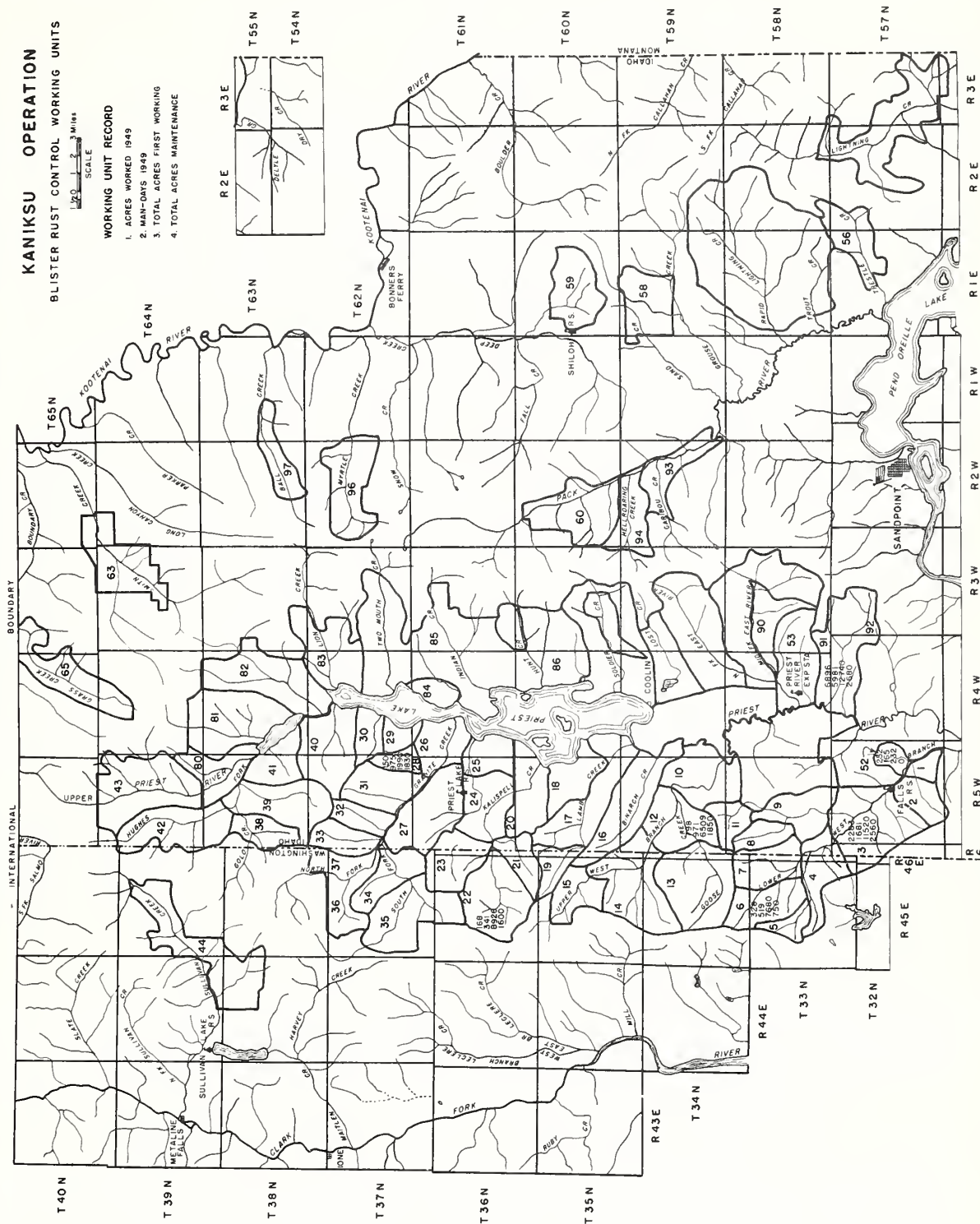
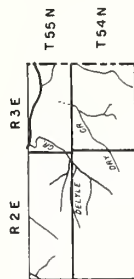
KANIKSU OPERATION

BLISTER RUST CONTROL WORKING UNITS



WORKING UNIT RECORD

1. ACRES WORKED 1949
2. MAN-DAYS 1949
3. TOTAL ACRES FIRST WORKING
4. TOTAL ACRES MAINTENANCE



BLISTER RUST CONTROL, KANIKSU OPERATION, 1949

By

H. A. Brischle, Operation Supervisor
R. L. Hilding, Forester, U. S. Forest Service

INTRODUCTION

The blister rust control program on the Kaniksu operation consisted of a 30-man camp administered by the Bureau of Entomology and Plant Quarantine and 7 camps employing 113 men administered by the Forest Service. In addition to these camps, 30 contract workers completed 21 areas ranging in size from 43 to 123 acres. The first camps on the project were established in Big Creek and at the Boswell Administrative Site June 6. All camps were manned by June 25. The first camp closed September 1, and the last September 15.

All work was in young, high priority stands. Wherever practical, ribes populations were reduced to maintenance standards. Bureau crews and contractors worked 1,487 acres. Forest Service crews and contractors worked 5,409 acres. The combined work of both agencies resulted in 4,517 acres being placed on maintenance.

The employment situation was favorable. A high percent of the men hired had previous blister rust experience. Most of the workers were college students and their returning to school accounted for the closing of camps early in September. A 48-hour work week was in effect through June, July, and August, and was a material influence in keeping men on the job as well as increasing the effective man-days for the season. The turnover in personnel was low, the workers being more stable than at any time since 1941.

The disease and stocking survey conducted during the summer indicates there was an appreciable spread of rust in 1946, but not nearly so intensive or general over large areas as the 1941 wave. There was comparatively little rust development on ribes during the late summer and fall, indicating a minimum spread in 1949.

Bureau crews were not called upon for fire duty during the season. Forest Service crews were called on several fires of short duration, causing little loss from blister rust work.

METHODS AND TRAINING

All Bureau and Forest Service areas, as well as contract areas, were worked by the one-man dragline method. Prompt inspection of completed lots made it possible to hold each worker responsible for prescribed standards of efficiency and production. The one-man method has developed individual responsibility in the workers so that supervision has been reduced to a minimum.

Chemical equipment and 2,4,5-T spray were used wherever practical. A truck-mounted high pressure sprayer was used on ribes concentrations accessible by roads. Less accessible places were treated with portable power units and Hi-Fog guns. Valuable assistance was obtained throughout the season from the methods project in the application of methods and use of chemical equipment.

Due to the favorable results of contract work in 1948, this phase of the program was materially increased in 1949. Approximately 29 percent of the area worked by the Bureau and 24 percent of that worked by the Forest Service in 1949 were under contract.

Charts and illustrated material were used to train the men in proper work methods and in the use of tools and equipment. This was followed by periodic instruction throughout the summer. Athletic equipment was secured through donations from the workers. Softball and basketball games after work hours and over week ends proved valuable in building good camp morale.

CHECKING AND SURVEYS

A crew of 10 Forest Service and Bureau checkers did the necessary current and post check work. Checkers inspected the $1\frac{1}{4}$ -acre lots promptly upon completion to insure the quality of work. A sample random strip was run in each lot and all likely ribes sites were inspected. By this method, it is estimated at least 12 percent of the ground was inspected. Two Forest Service men were needed to lay out and check completed contract work.

In addition to the regular check, 8,585 acres were post checked and reclassified as 2,840 acres on maintenance and 5,745 acres needing rework. All areas set up for contract work were first post checked to determine as accurately as possible the existing ribes pattern and the need for working.

A six-man crew under the supervision of Robert S. Morgan, Forester, conducted a disease and stocking survey from June 1 to October 30. Its purpose was to obtain additional damage and stocking data in pole stands in order to adjust unit boundaries to meet pathological and physical requirements for feasible blister rust control units.

Surveys were made in 20 units in the Priest Lake drainage extending from the Lower West Branch through to the Upper Priest River drainage. Rust damage to pine on a quadrat basis for the units surveyed is as follows:

Hughs Ridge	12%	Kalispell Creek	12%
Boulder Creek	24%	Upper Lamb Creek	11%
Zero Creek	38%	Lamb Creek	10%
Fedar Creek	14%	Solo Creek	23%
Tunnel Creek	24%	Pelke	16%
Kalispell Bay	10%	Reeder Mountain	25%

Upper Priest was surveyed for the first time; damage above Rock Creek was found to be 74 percent or almost a complete loss of the present stand of white pine. Other areas lost to white pine are Tillicum Creek, Cache Creek, south fork of Granite Creek, Upper Hughs Fork, and Quartz Creek.

In addition to damage and stocking data, the crew also recorded information on pole blight which was submitted to the Division of Forest Pathology. Pole blight has been found in the Lower West Branch, Binarch Creek, Lamb Creek, and Reeder Mountain areas.

LOCATION AND DESCRIPTION OF AREAS

Bureau Camp 401

Located at the forks of Big Creek in working unit 92. Work was completed on 1,061 acres at the rate of .81 man-day per acre; 28 ribes per acre were removed. As a result of this work, 350 acres were placed on maintenance and 711 were placed in the post check category. Future work in the drainage will be confined to stream type and isolated patches of upland which can be worked to advantage by contractors. The Big Creek drainage has presented a ribes control problem due to conditions following logging and a 1931 burn.

The initial strength of the camp was 30 men. Ten men took ribes eradication contracts during July and August when six contract areas were awarded.

Bureau Contract Work

Contracts totaling 626 acres and obligating \$4,448.76 were awarded to low bidders for the eradication of ribes on 6 areas in the Fox Creek drainage. Four areas amounting to 426 acres were completed to specifications; time was extended on 2 until 1950. Accepted prices ranged from \$9.74 to \$12.41 per acre. The average total cost was \$12.22 per acre after estimated administrative costs of \$2 per acre were added. As a result of the work, the entire 626 acres were placed on maintenance. Additional contracts to complete all necessary work in Fox Creek are planned for 1950.

Forest Service Camp 400

Located at Blister Rust Control Headquarters, Kalispell Bay. The first 2 weeks in July a crew of 10 men completed the necessary work on 63 acres of upland adjacent to white pine plantations in Kalispell Bay working unit No. 20. After mid-July, a three-man crew was trained to operate a truck-mounted high pressure spray unit. This unit, using 2,4,5-T spray, was used to treat small Ribes lacustre and R. viscosissimum adjacent to plantations in the vicinity of Diamond Peak. Ribes were associated with other low brush which necessitated covering the area by the broadcast method. An area of 37 acres was covered at the rate of 2.81 man-days per acre. It is estimated that 37,000 ribes were treated. In August, the men and equipment were moved to Forest Service Camp 451 where 13 acres of recent cutover supporting many small ribes were treated. This area is adjacent to the South Baldy plantation. It was treated at the rate of 1.54 man-days per acre. It is estimated 23,400 R. lacustre and R. viscosissimum were treated.

Forest Service Camp 451

Camp 451 was located near the Boswell Administrative Site. Areas worked were in the South Baldy, Pee Wee Creek, and Tunnel Creek plantations. Pee Wee and Tunnel Creek plantings are on recent control burns. Protection of these planted areas involved the removal of large ribes from the unburned portions as well as ribes seedlings from the newly planted burn. In addition to 583 acres of plantation, this camp completed work on 1,544 acres in reproduction and cutover type. As a result of this work, 1,224 acres of 1910-39 reproduction were placed on maintenance.

Forest Service Camp 452

Camp 452 was located near the Pelke Administrative Site. Men were housed in permanent camp-type buildings constructed in 1948 in cooperation with the Falls Ranger District. Buildings and facilities are shared jointly with the district crews, thus minimizing equipment rental costs and the cost of constructing and dismantling temporary camps.

The camp worked 798 acres in reproduction and cutover stands within the Pelke unit. As a result of the season's work, 268 acres were placed on maintenance.

Forest Service Camp 453

Located on Fedar Creek, a tributary of Granite Creek. This area is known as the Fedar Creek unit and comprises 1,990 acres; 1,331 are plantation and young natural white pine stands. As a result of this year's work, the entire unit has been placed on maintenance.

If sound timber management is practiced, this unit should require a minimum of future blister rust control work to carry the existing young stands through to maturity.

Forest Service Camp 454

Camp 454 was a 12-man pack camp located along the ridge between Hungry Mountain and Kalispell Rock. Work started in 1948 was continued. Hi-Fog guns were used to apply 2,4,5-T spray to numerous large ribes intermingled with brush. Many windfalls and the brush made it impractical to continue with spray equipment, and plans were made for a control burn. Early damp weather prevented carrying out this plan. It is hoped conditions will be favorable for burning in 1950. After the area is burned, it will be an integral part of the existing plantation and can be planted to desirable species.

From observations made during the summer, it appears that approximately 85 percent of the R. lacustre and R. viscosissimum treated in 1948 were dead. Present plans are to continue with Hi-Fog spray work between Gleason Mountain and Hungry Mountain in 1950.

Forest Service Contract Work

Seventeen contract areas totaling 1,299 acres were completed by contractors during the year. The areas are all in the Lower West Branch drainage and ranged in size from 57 acres to 123 acres. The 1949 contract prices varied from \$8.23 to \$16.50 per acre, depending on working conditions. The average net price paid to contractors was \$12.44. Estimated administrative costs were \$3 per acre, making the total cost \$15.44.

Contract work started early in April and continued through September. No areas were checked for payment after September 15 due to early defoliation of ribes. All areas approved for payment were worked to contract specifications and resulted in the completion of 1,299 acres, 53 percent of which was placed on maintenance.

The 17 completed contract areas were awarded to 11 different contractors. Approximately 30 men participated in the work. All contractors who carried on their job in a businesslike manner were able to show a good rate of pay for their work. One of the main difficulties experienced by most contractors is the inability to properly subsist themselves. In time, contractors will become better equipped and overcome some of the obstacles encountered during the past season.

In addition to the completed work, there are 20 areas involving 1,737 acres on which awards were made late in the year, or time extended to June 30, 1950. The total obligated amount for 1949, completed and incompleted contracts, is \$41,625. The outlook for contract work in the future is favorable. Bidding on all areas has been spirited and highly competitive.

STATEMENT OF EXPENDITURES AND COSTS

The statement of expenditures is shown in the following table:

TABLE 1

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1949 KANIKSU OPERATION

Item	Bureau of Entomology & Plant Quarantine					Forest Service BLR-4	Total
	BLR-1-4	Cooperative Control			Total		
		Federal BLR-3-4	State & Private	Total			
Contract ribes erad.		\$ 4,586		\$ 4,586	\$ 4,586	\$ 16,158	\$ 20,744
Salary perm. men	\$ 9,291	789		789	10,080	11,125	21,205
Salary temp. men	158	867	\$ 1,952	2,819	2,977	13,120	16,097
Wages temp. laborers	120	2,562	8,269	10,831	10,951	69,277	80,228
Subsistence supplies	138	1,880		1,880	2,018	20,165	22,183
Equipment	215	57		57	272	1,461	1,733
Travel and transp.	833	374		374	1,207	3,313	4,520
Other expenses	913	842		842	1,755	8,472	10,227
Total	\$11,668	\$11,957	\$10,221	\$22,178	\$33,846	\$143,091	\$176,937

TABLE 2

SUMMARY OF RIBES ERADICATION, 1949
KANIKSU OPERATION

Working	Eradication Type	Year of Origin	Acres	Man-Days	Ribes	Per Acre	
						Man-Days	Ribes
First	Plantation	1945-49	263	342	10,373	1.28	39
	Cutover	1945-49	81	131	7,827	1.62	97
	Cutover	1940-44	30	22	1,042	.73	35
	Reproduction (1)	1910-39	147	299	44,033	2.03	300
	Pole (2)		12	49	7,260	4.08	605
	Total		538	843	70,535	1.57	131
Second	Cutover	1940-44	142	39	326	.27	2
	Cutover	1920-39	833	928	14,016	1.11	17
	Reproduction (3)	1910-39	979	392	14,404	.40	15
	Pole		324	98	884	.30	3
	Total		2,278	1,457	29,630	.64	13
Third	Plantation	1945-49	315	499	29,282	1.58	93
	Cutover (4)	1940-44	240	193	29,079	.80	121
	Cutover	1920-39	1,287	778	23,763	.60	18
	Reproduction (5)	1910-39	1,856	1,874	67,120	1.01	36
	Pole		185	85	984	.46	5
	Mature		43	9	62	.21	1
	Stream		154	243	4,422	1.58	29
	Total		4,080	3,681	154,712	.90	38
GRAND TOTAL			6,896	5,981	254,877	.87	37

Chemical work included above:

Upland

Gallons
Acres Man-Days Spray

(1)	65	253	1,323
(2)	12	49	434
(3)	91	39	191
(4)	13	20	3,000 *
(5)	37	104	13,700 *

* Broadcast spraying 2,4,5-T

TABLE 3

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1949
KANIKSU OPERATION

State	Working	Class	Acres	Man-Days	Ribes	Gallons Spray	Per Acre	
							Man-Days	Ribes
Idaho	First	FS-Reg.	461	541	20,825		1.17	45
		EQ-Coop.	85	26	679		.31	8
	Second	FS-Reg.	1,661	1,123	13,449		.68	8
		FS-Cont.	441	269	7,821		.61	18
		Total	2,187	1,418	21,949		.65	10
	Third	EQ-Coop.	976	830	28,561		.85	29
		EQ-Cont.	426	254	1,656		.60	4
		FS-Reg.	1,449	1,054	13,864		.73	10
		FS-Cont.	758	836	16,360		1.10	22
		Total	3,609	2,974	60,441		.82	17
	All Workings	EQ-Coop.	1,061	856	29,240		.81	28
		EQ-Cont.	426	254	1,656		.60	4
		FS-Reg.	3,571	2,718	48,138		.76	13
		FS-Cont.	1,199	1,105	24,181		.92	20
		Total	6,257	4,933	103,215		.79	16
Washington	First	FS-Reg.	77	302	49,710	1,752	3.92	646
	Second	FS-Reg.	91	39	7,681	191	.43	84
		FS-Reg.	371	630	89,744	16,700	1.70	242
	Third	FS-Cont.	100	77	4,527		.77	45
		Total	471	707	94,271	16,700	1.50	200
	All Workings	FS-Reg.	539	971	147,135	18,643	1.80	273
		FS-Cont.	100	77	4,527		.77	45
		Total	639	1,048	151,662	18,643	1.64	237
Total	First	FS-Reg.	538	843	70,535	1,752	1.57	131
	Second	EQ-Coop.	85	26	679		.31	8
		FS-Reg.	1,752	1,162	21,130	191	.66	12
		FS-Cont.	441	269	7,821		.61	18
		Total	2,278	1,457	29,630	191	.64	13
	Third	EQ-Coop.	976	830	28,561		.85	29
		EQ-Cont.	426	254	1,656		.60	4
		FS-Reg.	1,820	1,684	103,608	16,700	.93	57
		FS-Cont.	858	913	20,887		1.06	24
		Total	4,080	3,681	154,712	16,700	.90	38
	All Workings	EQ-Coop.	1,061	856	29,240		.81	28
		EQ-Cont.	426	254	1,656		.60	4
		FS-Reg.	4,110	3,689	195,273	18,643	.90	48
		FS-Cont.	1,299	1,182	28,708		.91	22
		Total	6,896	5,981	254,877	18,643	.87	37

TABLE 4

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1949
KANIKSU OPERATION

State	Working	Acres Worked								
		By Forest Service			By BEPQ	Total Federal	Total Other			GRAND TOTAL
		National Forest	Private	Total	State	National Forest	State	Private	Total	
Idaho	First	421	40	461		421		40	40	461
	Second	1,930	172	2,102	85	1,930	85	172	257	2,187
	Third	1,906	301	2,207	1,402	1,906	1,402	301	1,703	3,609
	Total	4,257	513	4,770	1,487	4,257	1,487	513	2,000	6,257
Washington	First	77		77		77				77
	Second	91		91		91				91
	Third	324	147	471		324		147	147	471
	Total	492	147	639		492		147	147	639
Total	First	498	40	538		498		40	40	538
	Second	2,021	172	2,193	85	2,021	85	172	257	2,278
	Third	2,230	448	2,678	1,402	2,230	1,402	448	1,850	4,080
	Total	4,749	660	5,409	1,487	4,749	1,487	660	2,147	6,896

TABLE 5

RIBES SPECIES ERADICATED, 1949
KANIKSU OPERATION

Working	Eradication Type	Acres	Ribes Species			Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes inermis	
First	Plantation (1945-49)	268	1,935	8,438		10,373
	Cutover (1945-49)	81	260	7,567		7,827
	Cutover (1940-44)	30	262	1	779	1,042
	Reproduction (1910-39)	147	8,084	35,941	8	44,033
	Pole	12	1,870	5,390		7,260
	Total	538	12,411	57,337	787	70,535
Second	Cutover (1940-44)	142	273	13	40	326
	Cutover (1920-39)	833	7,544	6,331	141	14,016
	Reproduction (1910-39)	979	4,066	10,026	312	14,404
	Pole	324	362	522		884
	Total	2,278	12,245	16,892	493	29,630
Third	Plantation (1945-49)	315	3,216	26,055	11	29,282
	Cutover (1940-44)	240	7,163	21,916		29,079
	Cutover (1920-39)	1,287	15,788	7,707	268	23,763
	Reproduction (1910-39)	1,856	12,915	50,079	4,126	67,120
	Pole	185	509	209	266	984
	Mature	43	48	14		62
	Stream	154	2,605		1,817	4,422
	Total	4,080	42,244	105,980	6,488	154,712
All Workings	Plantation (1945-49)	583	5,151	34,493	11	39,655
	Cutover (1945-49)	81	260	7,567		7,827
	Cutover (1940-44)	412	7,698	21,930	819	30,447
	Cutover (1920-39)	2,120	23,332	14,038	409	37,779
	Reproduction (1910-39)	2,982	25,065	96,046	4,446	125,557
	Pole	521	2,741	6,121	266	9,128
	Mature	43	48	14		62
	Stream	154	2,605		1,817	4,422
	Total	6,896	66,900	180,209	7,768	254,877



TABLE 6

SUMMARY OF RIBES ERADICATION, 1923-1949
KANIKSU OPERATION

Working	Eradication Type	Year of Origin	Gross Acres Worked	Man-Days	Ribes	Per Acre		Net Acreage Remaining	
						Man-Days	Ribes	Worked	Unworked
First	Burn	1945-49	243	548	111,750	2.26	460	243	
	Plantation	1945-49	298	359	11,971	1.20	40	298	205
	Cutover	1945-49	1,105	1,172	163,163	1.06	148	1,105	7,395
	Burn	1940-44	210	184	47,333	.88	225	210	
	Plantation	1940-44	2,631	1,317	490,404	.50	186	2,631	
	Cutover (4)	1940-44	4,688	3,699	690,602	.79	147	4,688	35,846
	Cutover	1920-39	12,147	8,924	1,875,327	.73	154	11,573	24,406
	Reproduction (5)	1910-39	167,303	119,924	32,877,424	.72	197	160,684	24,410
	Pole (6)		129,971	45,862	6,365,218	.35	49	128,656	23,852
	Mature		142,774	30,837	5,824,592	.22	41	110,479	39,296
	Miscellaneous		7,387	5,011	1,995,603	.68	270	6,024	1,277
	Stream (1)		22,927	50,273	9,390,276	2.19	410	22,283	6,889
	Total		491,684	268,110	59,843,663	.55	122	448,874	163,576
Second	Plantation	1945-49	295	471	115,811	1.60	393	295	
	Plantation	1940-44	2,631	1,435	50,089	.55	19	2,631	
	Cutover	1940-44	707	376	10,796	.53	15	707	
	Cutover	1920-39	8,459	9,985	1,836,299	1.18	217	8,459	
	Reproduction (7)	1910-39	55,961	46,658	5,716,872	.83	102	55,053	
	Pole (8)		39,075	17,046	1,160,908	.44	30	39,075	
	Mature		7,372	4,044	360,045	.55	49	7,372	
	Miscellaneous		1,377	656	47,147	.48	34	1,377	
	Stream (2)		12,342	16,412	1,507,256	1.33	122	12,287	
	Total		128,219	97,083	10,805,223	.76	84	127,256	
Third	Plantation	1945-49	315	499	29,282	1.58	93	315	
	Plantation	1940-44	1,933	480	13,310	.25	7	1,933	
	Cutover (9)	1940-44	386	278	29,788	.72	77	386	
	Cutover	1920-39	7,795	6,131	423,391	.79	54	7,795	
	Reproduction (10)	1910-39	20,362	18,617	1,294,937	.91	64	20,362	
	Pole (11)		2,519	780	67,095	.31	27	2,519	
	Mature		1,299	697	107,927	.54	83	1,299	
	Miscellaneous		637	288	5,587	.45	9	637	
	Stream (3)		1,989	2,361	94,516	1.19	48	1,989	
	Total		37,235	30,131	2,065,833	.81	55	37,235	
GRAND TOTAL			657,138	395,324	72,714,719	.60	111	613,365	

Chemical work included above:

Stream				Upland			
	Acres	Man-Days	Gallons Spray		Acres	Man-Days	Gallons Spray
(1)	90	109	3,704	(4)	347	283	9,596
(2)	20	21	199	(5)	296	390	1,734
(3)	47	15	150	(6)	12	49	434
				(7)	101	44	201
				(8)	57	46	29
				(9)	13	20	3,000
				(10)	42	107	13,705
				(11)	51	55	51

TABLE 7

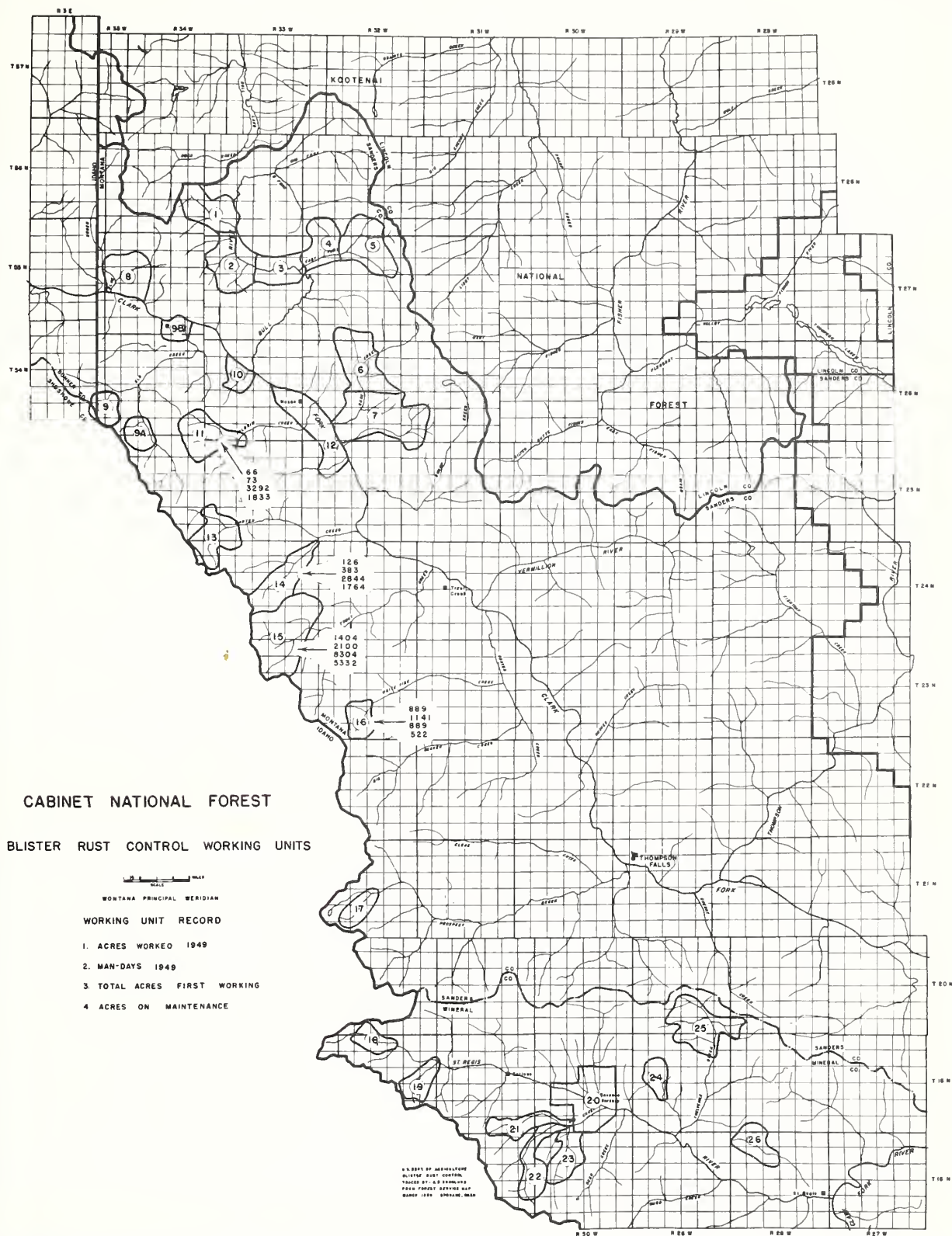
SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1923-1949
KANIKSU OPERATION

State	Class	Gross Acres	Man-Days	Total Ribes	Gallons Spray	Per Acre	
						Man-Days	Ribes
Idaho	EQ-Reg.	18,796	6,844	1,066,689		.36	57
	EQ-Coop.	163,762	66,437	12,013,990	1,979	.41	73
	EQ-Cont.	426	254	1,656		.60	4
	EQ-Emerg.	99,041	68,851	11,333,497		.70	114
	FS-Reg.	57,127	51,474	5,318,968	3,374	.90	93
	FS-Cont.	2,029	1,561	31,890		.77	16
	FS-Emerg.	99,269	38,823	8,788,474		.39	89
	CCC	62,419	50,478	8,451,835		.81	135
Washington	Total	502,869	284,722	47,006,999	5,353	.57	93
	EQ-Emerg.	31,629	19,288	6,754,071		.61	214
	FS-Reg.	63,846	52,146	11,448,629	27,445	.82	179
	FS-Cont.	100	77	4,527		.77	45
	FS-Emerg.	36,366	14,386	4,013,260		.40	110
	CCC	22,328	24,705	3,487,233		1.11	156
Total	Total	154,269	110,602	25,707,720	27,445	.72	167
	EQ-Reg.	18,796	6,844	1,066,689		.36	57
	EQ-Coop.	163,762	66,437	12,013,990	1,979	.41	73
	EQ-Cont.	426	254	1,656		.60	4
	EQ-Emerg.	130,670	88,139	18,087,568		.67	138
	FS-Reg.	120,973	103,620	16,767,597	30,819	.86	139
	FS-Cont.	2,129	1,638	36,417		.77	17
	FS-Emerg.	135,635	53,209	12,801,734		.39	94
Total	CCC	84,747	75,183	11,939,068		.89	141
	Total	657,138	395,324	72,714,719	32,798	.60	111

TABLE 8

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1923-1949
KANIKSU OPERATION

State	Ownership	Net Acres in Control Area					
		Acres Worked				Acres Unworked	Total Acres
		First	Second	Third	Total		
Idaho	National Forest	181,188	50,332	8,107	239,627	54,521	235,709
	Public Domain	54			54	80	134
	Subtotal Federal	181,242	50,332	8,107	239,681	54,601	235,843
	State	103,915	28,351	14,131	146,397	31,122	135,037
	Private	66,476	16,670	4,048	87,194	43,611	110,087
	Subtotal Other	170,391	45,021	18,179	233,591	74,733	245,124
	Total	351,633	95,353	26,286	473,272	129,334	480,967
Washington	National Forest	90,049	29,915	10,454	130,418	30,599	120,648
	State	2,080	80		2,160		2,080
	Private	5,112	1,908	495	7,515	3,643	8,755
	Subtotal Other	7,192	1,988	495	9,675	3,643	10,835
	Total	97,241	31,903	10,949	140,093	34,242	131,483
Total	National Forest	271,237	80,247	18,561	370,045	85,120	356,357
	Public Domain	54			54	80	134
	Subtotal Federal	271,291	80,247	18,561	370,099	85,200	356,491
	State	105,995	28,431	14,131	148,557	31,122	137,117
	Private	71,588	18,578	4,543	94,709	47,254	118,842
	Subtotal Other	177,583	47,009	18,674	243,266	78,376	255,959
Total	Total	448,874	127,256	37,235	613,365	163,576	612,450



BLISTER RUST CONTROL, CABINET OPERATION, 1949

By

A. S. Skoglund, Operation Supervisor
Neil Fullerton, Forester

INTRODUCTION

All ribes eradication in 1949 in the Cabinet National Forest was directed toward protection of young white pine plantations and reproduction. A total of 2,485 acres was worked which brings the net progress to 81,629 acres initially worked and 17,405 acres reworked. Approximately 13,000 acres remain to be initially worked and 24,893 acres are in need of rework.

Fire seriously interfered with control operations. During August over 40 percent of the time was spent fighting fire. This resulted in a large labor turnover which necessitated the closing of camps prior to Labor Day.

Man-day requirements per acre were reduced by the application of new techniques and employment of higher quality labor. Camp construction costs were above normal as considerable damage to standing tent and mess hall frames resulted from unusually heavy snows. Many man-days of labor were also used in reconstruction of roads and trails washed out by high water of the past few years.

The Timber Products Bureau of the Spokane Chamber of Commerce visited Savenac Nursery and adjacent areas during May as a part of its annual field trip. All phases of timber management, including blister rust, were discussed. The group viewed the entire transition of the tree from the preparation and planting of the seed and care of the young stock to the selective cutting of mature stands and milling of the lumber. Personnel of the Forest Service, Bureau of Entomology and Plant Quarantine, state and private foresters, and operators helped conduct the tour.

LOCATION AND DESCRIPTION OF AREAS

In the Trout Creek-Marten Creek units, one camp of 90 men was re-established on Minton Ridge on June 1. Rework was continued in four Robin Run plantations and the protection zones were extended. This drainage was completely burned over in 1910, reburned in 1934, and partially planted in 1939. The plantations are showing excellent growth with a survival of over 90 percent of trees planted. Blister rust infection is very light. A total of 75 acres remains to be initially worked next season.

In Marten Creek, additional work was done in reproduction stands in the upper portion of the drainage. Although 20 percent of the original stocked white pine quadrats have already been lost from blister rust, the area still consists of well-stocked 30-year-old stands containing 40 to 50 percent white pine. Ribes are generally heavy over the entire area. The heavier concentrations of ribes were treated with 2,4,5-T sprays pumped from a power sprayer. Good progress was being made until the call for fire duty closed all operations in the unit.

One 33-man camp was established on White Pine Creek on June 13. This area was burned in 1910 and planted in 1931. The unit contains approximately 1,200 acres

of which 700 acres are well stocked reproduction stands and plantations of 50 to 75 percent white pine. Blister rust infection is very light and little damage has occurred. The area was not completed due to heavy turnover of overhead and crewmen.

METHODS AND TRAINING

All men were trained in use of the one-man dragline system. In this method of ribes eradication, a crewman was assigned to a lane $2\frac{1}{2}$ chains wide and laid out in 5-chain long blocks. Generally the lanes were worked from the top toward the bottom with the crewman pulling his dragline as he worked along. When it was necessary to start at the bottom of a lane, the individual always laid his dragline in advance of actual work. Men especially trained in compass and pacing were used to lay out all lanes and blocks. Every other lane was permanently marked to facilitate relocation.

A Friend power sprayer was used to apply 2,4,5-T sprays to heavy concentrations of ribes in Marten Creek. Water was supplied to the sprayer by the 500-gallon tank truck that furnished water to the camp. About three-fourths mile of main line hose was laid downhill from the sprayer located on the road. Four lateral spray hoses were used from the main line with a pressure of 125 pounds.

Knapsack units were used to spray ribes along streams. All chemical work appeared to be effective. Ribes triste and R. inerme sprayed in 1948 were completely killed by one application of 2,4,5-T spray.

Every man reporting to the job received the same thorough and systematic program of training. Differences in production accomplishments during the season were due entirely to individual abilities.

One ribes eradication contract was executed on 66 acres in Pilgrim Creek. The cost amounted to \$23.50 per acre including layout and checking charges. While no saving was made, the contract was awarded in expectation of gains to be made in the future through competitive bidding.

SAFETY

The vigorous safety program employed during the past several years has produced results. In 1949 there were four reportable accidents and no lost time accidents which means that no field time was lost due to injuries. There has also been a noticeable saving of equipment and supplies from accidental damage. Adequate training during the indoctrination period followed up with regularly scheduled safety meetings has impressed upon the individuals the value and necessity of safety consciousness.

CHECKING AND SURVEYS

A crew of three checkers under the direction of a checker foreman checked all worked area. In addition, they ran a post check on 2,500 acres in McKay Creek to determine the status of these areas initially worked in 1934.

The intensive checking procedure adopted for checking of one-man lanes has accomplished two things. It has resulted in a higher percent check of areas at no additional cost and has assisted eradication crews to achieve higher standards of work. Greater efficiency is attained by designating rework areas in small units.

A crew of three men was trained to do stocking and disease survey. The same procedure was used as that adopted for last season. Surveys were not completed for Pilgrim and Rock Creeks. Results are summarized in the following analysis.

WHITE PINE STOCKING AND BLISTER RUST LOSS SURVEY

Unit	Class	No. Chains	Total Stocking	Percent White Pine Stocking	Percent Damage
Dry Cr.	2	233	Well	29	18
	3A & 3B	446	Medium	9	34
Star Gulch	3B	254	Medium	5	31
Rock Cr.	2	683	Medium	12	3
	3A & 3B	803	Medium	3	13
McKay Cr.	2	481	Well	32	6
	3A & 3B	1,185	Medium	6	6
Trout Cr.	1 & 2	1,540	Well	65	10
	3B	230	Light	80	17
White Pine Cr.	1 & 2	651	Medium	70	2
	3A & 3B	254	Light	37	8
W. F. Big Cr.	1 & 2	416	Medium	40	47
	3A	241	Medium	9	42
M. F. Big Cr.	1	190	Medium	60	47
	3A & 3B	163	Medium	6	35

CONTROL STATUS

A total of 43,925 acres is now on maintenance which represents 54 percent of the worked area. Of the 2,485 acres worked this season, 1,237 acres are on maintenance, 546 acres are on post check, and 702 acres are on rework.

An examination of 9,000 white pine transplants in Savenac Nursery revealed less than .1 percent blister rust infection. This reduction in infection from a high of .447 percent in 1942 is largely due to the removal of ribes from Haugan Look-out. However, as it is essential that the ribes in the immediate stream type be kept at a minimum, the stream type on Big Creek and Savenac Creek in the nursery zone should be worked by a few men early next season.

Reproduction stands in the St. Regis River units are in a critical stage as from now on there will be severe damage to the stands. Progress that will be made in the protection of these stands in the next two years will largely determine the final stocking. In Rivers Creek and the canyon portion of the middle fork of Big Creek, blister rust damage is so extensive that no further control work is warranted. In the unworked unit of Deer Creek, damage is so great that no ribes eradication should be performed prior to rehabilitation.

Since inception of the blister rust program in 1934, there has been little disturbance of the control areas. Fire has caused no damage to the stocking in any of the control units. Marten Creek is the only control unit from which any timber has been cut. In this unit, upon the removal of all merchantable products, the area will be burned and planted. Fifty-seven acres of pole timber were destroyed by three snow slides in 1937 on the east fork of Bull River.

The first indication of any pole blight in the Cabinet Forest was observed in Blue Creek in 1945. Pole blight has now been found in all drainages in the control units along Bull River as well as in Rock Creek and Smeads bench. Extensive damage occurs in Engle fork of Rock Creek and Snake Creek in the east fork of Bull River. Several plots have been established in these drainages by the research staff of the University of Idaho in order to study the cause and effect of the blight.

RESISTANT WHITE PINE

A conference of Forest Service and Bureau of Entomology and Plant Quarantine personnel was held at Savenac Nursery in September to consider propagation of white pine resistant to blister rust and to formulate plans for the establishment of an arboretum for resistant white pine. An area in Randolph Creek fulfilling the requirements was selected. A plot of 2.15 acres was cleared and slash wind-rowed by bulldozer in anticipation of planting next spring.

STATEMENT OF EXPENDITURES AND COSTS

The statement of expenditures is shown in the following table.

TABLE 1
CLASSIFIED EXPENDITURES, CALENDAR YEAR 1949
CABINET OPERATION

Item	Bureau of Entomology and Plant Quarantine	Forest Service	Total
	BLR-1-4	BLR-4	
Contract ribes erad.		\$ 1,444	\$ 1,444
Salary perm. men	\$2,369	7,611	9,980
Wages temp. labs.	30	64,041	64,071
Subs. supplies		14,079	14,079
Equipment	46	2,309	2,355
Travel and transp.	283	412	695
Other expenses	225	4,319	4,544
Total	\$2,953	\$94,215	\$97,168

TABLE 2
SUMMARY OF RIBES ERADICATION, 1949
CABINET OPERATION

Working	Eradication Type	Year of Origin	Acres	Man-Days	Ribes	Per Acre	
						Man-Days	Ribes
First	Reproduction (2)	1910-39	1,598	2,557	131,320	1.60	82
	Stream (1)		42	209	40,940	4.98	975
	Total		1,640	2,766	172,260	1.69	105
Second	Reproduction	1910-39	776	829	18,580	1.07	24
Third	Reproduction	1910-39	69	102	1,540	1.48	22
GRAND TOTAL			2,485	3,697	192,380	1.49	77

Chemical work included above:

Stream				Upland			
		Gallons				Gallons	
Acres	Man-Days	Spray		Acres	Man-Days	Spray	
(1)	42	197	3,935	(2)	25	81	1,600

TABLE 3
RIBES SPECIES ERADICATED, 1949
CABINET OPERATION

Working	Eradication Type	Acres	Ribes Species		Total Ribes
			Ribes lacustre	Ribes viscosissimum	
First	Reproduction (1910-39)	1,598	69,280	62,040	131,320
	Stream	42	38,880	2,060	40,940
	Total	1,640	108,160	64,100	172,260
Second	Reproduction (1910-39)	776	3,720	14,860	18,580
Third	Reproduction (1910-39)	69	260	1,280	1,540
All Workings	Reproduction (1910-39)	2,443	73,260	78,180	151,440
	Stream	42	38,880	2,060	40,940
	Total	2,485	112,140	80,240	192,380

TABLE 4

SUMMARY OF RIBES ERADICATION, 1928-1949
CABINET OPERATION

Working	Eradication Type	Year of Origin	Gross Acres Worked	Man-Days	Ribes	Per Acre		Net Acreage Remaining	
						Man-Day	Ribes	Worked	Unworked
First	Cutover	1940-1944							399
	Reproduction (4)	1910-1939	37,398	40,588	6,610,930	1.09	177	36,836	4,571
	Pole		25,959	9,213	1,745,885	.35	67	25,670	6,334
	Mature		9,377	4,457	1,064,702	.48	114	9,357	1,712
	Miscellaneous		4,900	2,230	596,499	.46	122	4,650	
	Stream (1)		5,116	16,375	3,694,928	3.20	722	5,116	
	Total		82,750	72,863	13,712,944	.88	166	81,629	13,016
Second	Reproduction	1910-1939	7,513	11,720	918,875	1.56	122	7,513	
	Pole		1,108	1,423	101,767	1.28	92	1,108	
	Mature		28	27	1,799	.96	64	28	
	Miscellaneous		33	34	1,503	1.03	46	33	
	Stream (2)		3,140	5,729	727,480	1.82	232	3,140	
	Total		11,822	18,933	1,751,424	1.60	148	11,822	
Third and Other	Reproduction	1910-1939	2,208	2,636	125,741	1.19	57	2,208	
	Pole		125	149	7,256	1.19	58	125	
	Stream (3)		3,250	3,922	193,635	1.21	60	3,250	
	Total		5,583	6,707	326,632	1.20	59	5,583	
GRAND TOTAL			100,155	98,503	15,791,000	.98	158	99,034	

Chemical work included above:

Stream				Upland			
Acres	Man-Days	Gallons Spray		Acres	Man-Days	Gallons Spray	
(1) 764	2,196	65,025		(4) 25	81	1,600	
(2) 250	579	26,821					
(3) 68	269	4,623					

TABLE 5

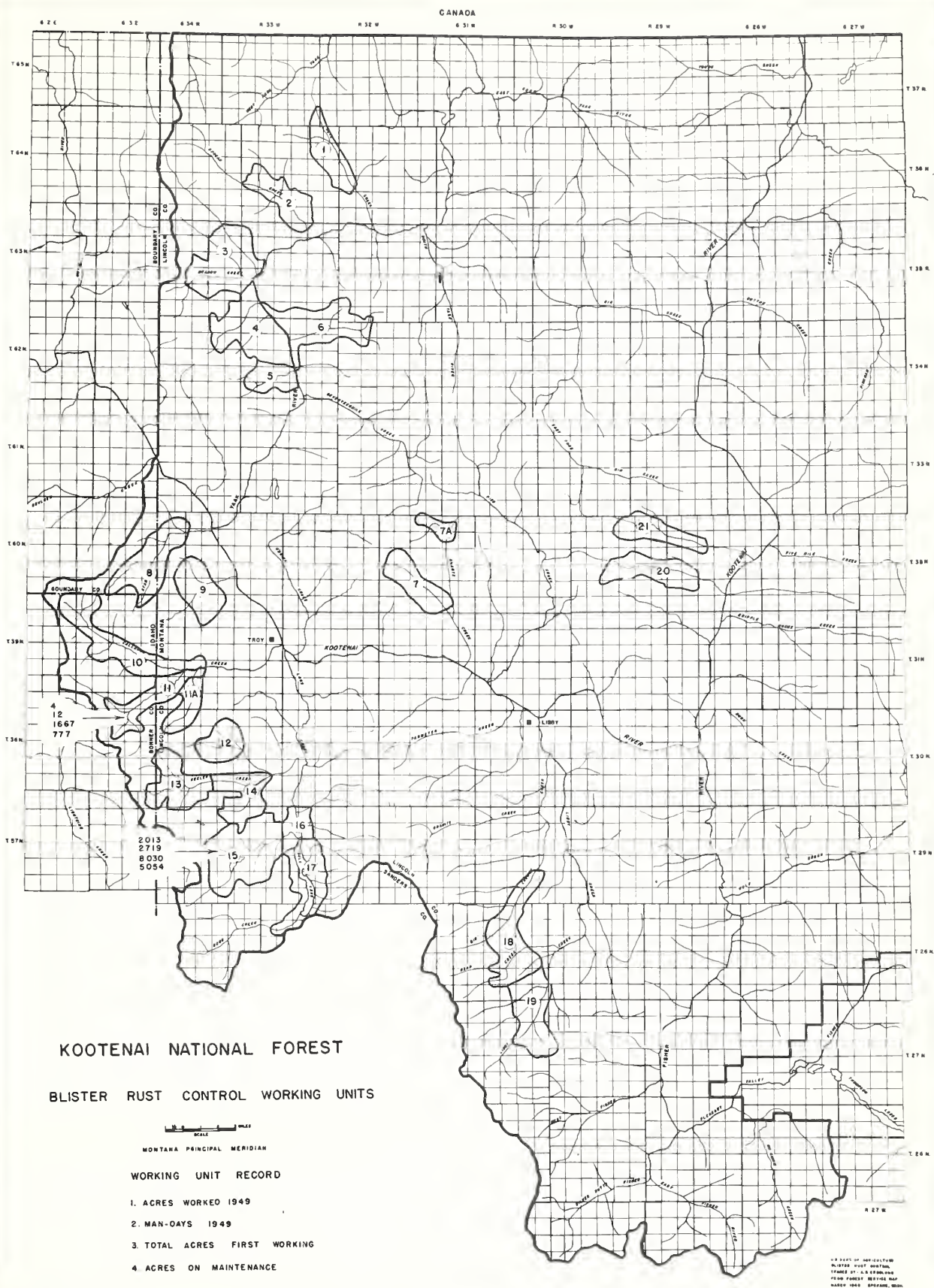
SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1928-1949
CABINET OPERATION

Class	Gross Acres	Man-Days	Total Ribes	Gallons Spray	Per Acre	
					Man-Days	Ribes
EQ-Reg.	2,002	3,295	761,710	34,795	1.65	380
EQ-Emergency	34,321	16,293	3,840,639	1,330	.47	112
FS-Reg.	29,456	42,376	3,677,138	33,981	1.44	125
FS-Cont.	66	73	4,400		1.11	67
FS-Emergency	31,172	30,968	6,990,634	21,638	.99	224
CCC	3,138	5,498	516,479	6,325	1.75	165
Total	100,155	98,503	15,791,000	98,069	.98	158

TABLE 6

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1928-1949
CABINET OPERATION

Ownership	Net Acres in Control Area					
	Acres Worked				Acres Unworked	Total Acres
	First	Second	Third	Total		
National Forest	65,017	9,766	3,569	78,352	9,009	74,026
Public Domain	40	3		43		40
Subtotal Federal	65,057	9,769	3,569	78,395	9,009	74,066
State	734	1		735		734
Private	15,838	2,052	2,014	19,904	4,007	19,845
Subtotal Other	16,572	2,053	2,014	20,639	4,007	20,579
Total	81,629	11,822	5,583	99,034	13,016	94,645



BLISTER RUST CONTROL, KOOTENAI OPERATION, 1949

By

A. S. Skoglund, Operation Supervisor

M. D. Oaks, Forester

INTRODUCTION

Ribes eradication in the Kootenai National Forest was performed mainly in pole stands in the vicinity of Spar Lake. A total of 2,017 acres was worked which brings the net progress to 58,179 acres initially worked and 5,768 acres re-worked. Approximately 55,000 acres remain to be initially worked and 11,500 acres are in need of rework. All scheduled work was completed by August 30. This was the first season since 1936 that fire had not interrupted or canceled portions of the program. All fires were providentially timed for week end action.

The men employed were of the highest quality and were selected from all parts of the country. After the tryout period, there was little labor turnover. Good camp facilities and management, intensive training, and selective recruitment were factors responsible for the successful season.

LOCATION AND DESCRIPTION OF AREAS

Two 45-man camps were established in the Spar Lake unit. The first camp was located on the shores of Spar Lake on June 1; the other erected on Farway Creek on June 13. This unit of 9,500 acres is composed of 3,400 acres of mature timber and 4,500 acres of 60-year-old white pine pole. The pole stands on the slopes of Hiatt Creek are well stocked and contain 50 percent white pine. The ribes population is light in the lower levels but extremely heavy in the higher levels and basins. Nine thousand acres have been initially worked and 500 acres of recent cutover need rehabilitating prior to any blister rust work. In the upper fork of Farway Creek, porcupines have caused appreciable damage in pole size timber.

At the end of the season, a few men covered in wide formation an area of 50 acres of pole in the upper end of Thicket Creek which was classified as being on post check, finding less than one ribes per acre. This area had been reworked in 1945 by Mexican and teen-age labor who removed 106 ribes per acre.

Only 12 man-days were required to respray the stream type in the south fork of Callahan Creek using 2,4,5-T solution. This area was sprayed in 1948 with Ammate. There was little bush kill although the live stem was temporarily killed. The treated area was also covered with seedlings. The time spent on respray was 16 percent of original requirements.

METHODS AND TRAINING

The one-man dragline method was used as standard procedure. In this system of ribes eradication, individual crewmen are assigned to lanes $2\frac{1}{2}$ chains wide, from 10 to 30 chains long, and marked off in 5-chain blocks. These lanes and blocks were laid out by men who had been trained in compass and pacing. All roads and

trails were traversed and 10-chain stations permanently established to facilitate laying out of areas and their future relocation.

Areas designated as low in ribes on basis of advance check were worked in a wide formation. Three men worked a $2\frac{1}{2}$ chain wide strip guiding on string lines, following one while laying the other. This procedure proved advisable as scattered ribes patches which did not show on check strips were located and removed. These patches were mapped as to location.

In the basins where the ribes were heavy, spraying with 2,4,5-T solutions was used as an auxiliary method to hand pulling of ribes. Whenever water was conveniently available, a knapsack unit was used to apply the spray; otherwise, the Hi-Fog guns were used. The 2,4,5-T concentrate was packed to the spraymen in 4-gallon cans mounted on pack boards. All the chemical work with 2,4,5-T appeared to be effective.

An area of 250 acres on Grizzly fork of Burnt Creek was laid out in four units for contracting. Invitations to bid were advertised in papers and post offices and presented to prospective bidders. Four individuals teamed together and submitted a joint bid of \$25 per acre for the entire area, but the bid was not accepted as it was estimated that the area could be worked by crews for \$17 per acre. This fall another prospective bidder examined the area and signified his intention of submitting a bid for less than \$17 per acre.

A training site was selected on Camp Creek outside of any control unit in order to obtain an area ideally suited to training needs. This area of cutover, pole, and stream types in close proximity contains patches of brush interspersed with Ribes lacustre and R. viscosissimum. Toward the end of the season, additional men were given training in compass and pacing to prepare them for various duties next season.

SAFETY

An intensive safety program employed throughout the season produced results. The only accident was an eye injury sustained by a foreman. This low frequency is commendable because of the rugged terrain in these particular control units. Regularly scheduled 10-minute weekly meetings supplemented intensive training given at the start of the season. The chairmanship of these meetings was delegated to the individual who in the previous week by vote of the entire camp was guilty of the most unsafe act in camp or field. This served to keep the subject of safety on everyone's mind at all times.

CHECKING AND SURVEYS

Four checkers completed a check on all one-man strips. In addition, they spent 10 days on advance survey work in Cherry Creek and 1 week on post check work in Burnt and Cyclone Creeks.

A crew of two men was trained to do stocking and disease survey. They were assisted by four others during the latter part of the season. Nearly all the

survey was confined to 45- to 60-year-old age class of pole, requiring much laborious climbing. Results are summarized in the following analysis.

Unit	Class	Number Chains	Total Stocking	Percent White Pine Stocking	Percent Damage
Spar Lake	1 & 2	466	Well	37	9
	3A	404	Medium	17	6
Red Top Cr.	1 & 2	240	Well	27	2
	3A & 3B	1,017	Medium	7	1
Cyclone Cr.	1 & 2	225	Well	48	0
	3A & 3B	754	Well	7	1
Burnt Cr.	3B	447	Medium	7	3

CONTROL STATUS

A total of 33,180 acres is now on maintenance, which represents 57 percent of the worked area. Better work was done by the crews this season than any since the war ended. Over 45 percent or 919 acres were placed on maintenance as a result of this season's work. Eight hundred and thirty-five acres reverted to unworked classification due to logging operations in several of the units.

It is recommended that no blister rust work be performed in the Howard Lake Unit. The stands in this unit are well stocked, but contain only 7 to 20 percent white pine. Five percent of the white pine has been damaged by the rust which has been present since 1941. While the work in the white pine areas would not be very great, the work in the protection zones would be excessive. These areas are precipitous, subject to frequent snow slides, and covered with brush and ribes. Blister rust control would be very costly and difficult due to the combination of long, narrow, and high canyon-like walls surrounding the area.

As shown by an advance survey, ribes eradication in Cherry Creek will involve mainly stream type and stream zones. The better stands of white pine are surrounded by a considerable ribes-free area. As infection is light and confined to streams, it is unlikely that there will be any serious threat from the canyons on the west.

No new areas of pole blight were found in an extensive survey of white pine pole stands. The pole blight was found in Ross Creek and Bull Lake in 1945 and in main Keeler Creek in 1947. The research staff of the University of Idaho has established several plots in the vicinity of Bull Lake to study the disease.

STATEMENT OF EXPENDITURES AND COSTS

The statement of expenditures is shown in the following table.

TABLE 1

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1949 KOOTENAI OPERATION

Item	Bureau of Entomology and Plant Quarantine	Forest Service	Total
	BLR-1-4	BLR-4	
Salary perm. men	\$2,369	\$ 8,368	\$10,737
Salary temp. men		8,206	8,206
Wages temp. labs.	30	42,860	42,890
Subs. supplies		8,786	8,786
Equipment	46	6,128	6,174
Travel and transp.	283	3,058	3,341
Other expenses	225	7,294	7,519
Total	\$2,953	\$84,700	\$87,653

TABLE 2

SUMMARY OF RIBES ERADICATION, 1949
KOOTENAI OPERATION

Working	Eradication Type	Year of Origin	Acres	Man-Days	Ribes	Per Acre	
						Man-Days	Ribes
First	Pole		913	1,507	159,520	1.65	175
	Mature (2)		119	400	68,790	3.36	578
	Stream		3	5	360	1.67	120
	Total		1,035	1,912	228,670	1.85	221
Second	Reproduction	1910-39	4	3	30	.75	8
	Pole		557	388	18,180	.70	33
	Mature		211	189	13,440	.90	64
	Stream		186	215	5,400	1.16	29
	Total		958	795	37,050	.83	39
Third	Stream (1)		24	24	4,790	1.00	200
GRAND TOTAL			2,017	2,731	270,510	1.35	134

Chemical work included above:

Stream

Upland

			Gallons			Gallons		
			Acres	Man-Days	Spray	Acres	Man-Days	Spray
(1)	4	12			272	(2)	12	52
								206

TABLE 3

RIBES SPECIES ERADICATED, 1949
KOOTENAI OPERATION

Working	Eradication Type	Acres	Ribes Species			Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes coloradense	
First	Pole	913	155,310	2,930	1,280	159,520
	Mature	119	66,910	750	1,130	68,790
	Stream	3	360			360
	Total	1,035	222,580	3,680	2,410	228,670
Second	Reproduction (1910-39)	4	30			30
	Pole	557	15,630	1,770	780	18,180
	Mature	211	13,080	320	40	13,440
	Stream	186	4,570	750	80	5,400
	Total	958	33,310	2,840	900	37,050
Third	Stream	24	3,790		1,000	4,790
All Workings	Reproduction (1910-39)	4	30			30
	Pole	1,470	170,940	4,700	2,060	177,700
	Mature	330	79,990	1,070	1,170	82,230
	Stream	213	8,720	750	1,080	10,550
	Total	2,017	259,680	6,520	4,310	270,510

TABLE 4

SUMMARY OF RIBES ERADICATION, 1935-1949
KOOTENAI OPERATION

Working	Eradication Type	Year of Origin	Gross Acres Worked	Man-Days	Ribes	Per Acre		Net Acreage Remaining	
						Man-Days	Ribes	Worked	Unworked
First	Plantation	1945-1949	244	125	5,462	.51	22	244	
	Cutover	1945-1949							835
	Cutover	1940-1944							5,730
	Cutover	1920-1939	1,274	767	55,365	.60	43	1,274	3,651
	Reproduction (4)	1910-1939	13,833	9,658	1,135,896	.70	82	13,074	9,682
	Pole		24,839	12,228	1,190,840	.49	48	23,787	18,953
	Mature (5)		17,323	4,847	678,302	.28	39	15,895	16,378
	Miscellaneous		346	95	7,956	.27	23	346	
	Stream (1)		3,954	12,472	1,681,453	3.15	425	3,559	
	Total		61,813	40,192	4,755,274	.65	77	58,179	55,229
Second	Plantation	1945-1949	236	184	2,742	.78	12	236	
	Cutover	1920-1939	322	262	9,803	.81	30	322	
	Reproduction	1910-1939	1,441	1,306	93,562	.91	65	1,441	
	Pole		2,026	1,676	77,440	.83	38	2,026	
	Mature (6)		228	204	21,030	.89	92	228	
	Stream (2)		1,564	2,938	154,975	1.88	99	1,336	
	Total		5,817	6,570	359,552	1.13	62	5,589	
Third and Other	Pole		133	276	10,360	2.08	78	133	
	Stream (3)		46	38	5,528	.83	120	46	
	Total		179	314	15,888	1.75	89	179	
GRAND TOTAL			67,809	47,076	5,130,714	.69	76	63,947	

Chemical work included above:

Stream			Upland		
Acres	Man-Days	Gallons Spray	Acres	Man-Days	Gallons Spray
(1) 149	297	16,563	(4) 10	50	620
(2) 15	16	1,950	(5) 12	52	206
(3) 4	12	272	(6) 5	5	750

TABLE 5

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1935-1949
KOOTENAI OPERATION

Class	Gross Acres	Man-Days	Total Ribes	Gallons Spray	Per Acre	
					Man-Days	Ribes
EQ-Emergency	31,755	14,494	1,934,776		.46	61
FS-Reg.	20,177	20,988	1,863,319	20,361	1.04	92
FS-Emergency	4,540	4,652	377,089		1.02	83
CCC	11,337	6,942	955,530		.61	84
Total	67,809	47,076	5,130,714	20,361	.69	76

TABLE 6

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1935-1949
KOOTENAI OPERATION

Ownership	Net Acres in Control Area					
	Acres Worked				Acres Unworked	Total Acres
	First	Second	Third	Total		
National Forest	55,007	5,038	179	60,224	44,223	99,230
State					173	173
Private	3,172	551		3,723	10,833	14,005
Subtotal Other	3,172	551		3,723	11,006	14,178
Total	58,179	5,589	179	63,947	55,229	113,408

BLISTER RUST CONTROL, MOUNT RAINIER NATIONAL PARK, 1949

By

J. C. Gynn, Operation Supervisor

C. M. Chapman, Pathologist

The 1949 white pine blister rust control program at Mount Rainier National Park was confined to ribes eradication on cliffs, precipitous slopes, and stream type in the vicinity of the White River campground and adjacent to the Sunrise Park area. The crew consisted of eight men, a superintendent, and a checker. Work started June 13 and ended September 10.

Five hundred forty acres were worked at 1.06 man-days per acre with an average of 84 ribes per acre. Chemical ribes eradication methods were used on 180 acres of stream type and 60 acres of steep slope and cliffs. The hormone chemical 2,4,5-T mixed with emulsifiable oil and water was applied as an aerial spray by use of Hi-Fog guns and manually operated trombone pumps. Emulsifiable oil and water used in place of fuel oil as a carrying and spreading agent reduced chemical costs. Chemical methods have alleviated the broken crown problem and reduced heavy germination of ribes seeds which normally follow soil disturbances resulting from hand grubbing. These two factors will reduce the amount of rework. Inspection of heavy ribes concentrations treated with 2,4,5-T in 1948 showed nearly 100 percent of the ribes dead in 1949. The only bushes surviving were four old large crown multistemmed Ribes watsonianum. These bushes apparently received insufficient chemical as all other R. watsonianum were dead. Other species encountered, including R. laxiflorum, R. acerifolium, R. bracteosum, R. lacustre, and R. viscosissimum, appear highly susceptible to the chemical 2,4,5-T.

Checking and control status. A 4 percent check was made of the entire White River control unit. During the process of checking, a new map was compiled. Using hand compass and pacing methods, all roads and control boundaries were traversed from established control lines and mapped as accurately as possible with other topographical features. Old maps sketched from early small-scale contour maps were not accurate enough for plotting missed ribes or delimiting small maintenance areas from those needing rework. The new survey showed the original area to be 510 acres larger than previously reported. Adjustments are made in the 1949 annual report accumulative tables. The 1949 check on 3,200 acres comprising the White River control unit showed 2,130 acres on maintenance, 100 acres on post check, and 970 acres on rework. Only 410 acres classified as rework are in difficult cliff and precipitous upland bordering Sunrise Park.

Rework areas in the White River unit can be handled best with a small maintenance crew using chemical methods on most of the area.

RECOMMENDATIONS

Longmire-Silver Forest. No ribes eradication or checking work was performed on Longmire-Silver Forest area in 1949. The following program on this unit is recommended for 1950: A complete 3-month period starting about June 12; a crew of eight men, one checker (SP-6), and one superintendent (SP-7). No additional spraying equipment will be needed. Check the entire area except that portion

not worked in 1948. Using the one-man dragline method, complete the area unfinished in 1948. Using 2,4,5-T, spray seedlings in the area known as "Hell's Half Acre" and in stream type. After completing this work, perform the maintenance work as shown by the 1950 check.

White River. No further ribes eradication work until the Longmire-Silver Forest area has been maintained.

RESULTS

The following tables show statements of expenditures, results of the 1949 field work and accumulative results of all work performed to date:

TABLE 1

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1949 MOUNT RAINIER NATIONAL PARK

Item	National Park Service
Personal Services	\$ 9,599.47
Communication Service	5.52
Contractual Services	648.72
Supplies & Materials	309.90
Equipment	246.90
Checker's Salary	1,090.44
Total	\$11,900.95

TABLE 2
SUMMARY OF RIBES ERADICATION, 1949
MOUNT RAINIER NATIONAL PARK

Area	Working	Acres	Man-Days	Ribes Species						Total Ribes	Gallons Spray 2,4,5-T	Per Acre	
				Ribes lacustre	Ribes viscosissimum	Ribes bracteosum	Ribes watsonianum	Ribes laxiflorum	Ribes acerifolium			Man-Days	Ribes
White River	Second	360	328	14,031	6,217		23	10	10	20,291	175	.91	56
	Other	180	244	8,791	1,508	71	116	13,248	1,175	24,909	499	1.36	133
	Total	540	572	22,822	7,725	71	139	13,258	1,185	45,200	674	1.06	84

TABLE 3
SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1930-1949
MOUNT RAINIER NATIONAL PARK

Class	Gross Acre	Net Acre	Man-Days	Total Ribes	Gallons Spray	Per Acre	
						Man-Days	Ribes
NP-Reg.	12,090	11,281	11,916	1,131,388	3,374	.99	94
NP-CCC	10,960	6,599	12,692	1,293,167		1.16	118
Total	23,050	17,880	24,608	2,424,555	3,374	1.07	105

TABLE 4
SUMMARY OF RIBES ERADICATION, 1930-1949
MOUNT RAINIER NATIONAL PARK
(NET CONTROL AREA)

Area	Working	Acres	Man-Days	Ribes Species						Total Ribes	Gallons Spray	Per Acre	
				Ribes lacustre	Ribes viscosissimum	Ribes bracteosum	Ribes watsonianum	Ribes laxiflorum	Ribes acerifolium			Man-Days	Ribes
Longmire	First	900	1,599	225,968		98,875		59,308	8,658	392,809		1.78	436
	Second	888	797	30,938		24,332		2,394	2,938	60,602		.90	68
	Other	3,072	4,490	89,581		19,959		4,051	42,637	156,228	100	1.46	51
	Total	4,860	6,886	346,487		143,166		65,753	54,233	609,639	100	1.42	125
White River	First	3,200	3,163	378,460	84,847	5,429	140,613	10,564	12,289	632,202		.99	198
	Second	3,012	2,812	84,562	22,532	2,330	6,964	16,239	4,547	137,174		.93	46
	Other	6,808	3,338	96,843	19,601	10,715	14,008	28,320	6,934	176,421	3,274	.49	26
	Total	13,020	9,313	559,865	126,980	18,474	161,585	55,123	23,770	945,797	3,274	.72	73
All Areas	First	4,100	4,762	604,428	84,847	104,304	140,613	69,872	20,947	1,025,011		1.16	250
	Second	3,900	3,609	115,500	22,532	26,662	6,964	18,633	7,485	197,776		.93	51
	Other	9,880	7,828	186,424	19,601	30,674	14,008	32,371	49,571	332,649	3,374	.79	34
	Total	17,880	16,199	906,352	126,980	161,640	161,585	120,876	78,003	1,555,436	3,374	.91	87

BLISTER RUST CONTROL, GLACIER NATIONAL PARK, 1949

By

J. C. Gynn, Operation Supervisor

C. M. Chapman, Pathologist

Ribes eradication work for the control of white pine blister rust in Glacier National Park during 1949 was carried on in both the East Glacier and Oldman Lake control units as recommended in the 1948 annual report.

Chemical methods were used for the first time in this park to considerable advantage. Savings were made to the extent that 150 acres in the Oldman Lake area, not included in the estimates for 1949, were worked without additional personnel. The hormone chemical 2,4,5-T mixed with emulsifiable oil and water was applied to the ribes selectively, using Hi-Fog guns developing 1,000 pounds pressure and manually operated trombone pumps. The one-man dragline method was used wherever possible when chemical methods were not applicable.

East Glacier. Acres worked, 200; man-days per acre, 1.02. Work started June 13. A superintendent, a checker, and 25 laborers were employed. Intensive training in the use of chemical and one-man dragline methods was carried on while working this area. After checking the 1949 work, it was classified for control status as follows: 113 acres on maintenance and 87 acres on rework. The area classified as rework represents Roes Creek stream type and unstable slopes producing ribes seedlings annually. It is believed the little soil disturbance by the chemical method will help to reduce troublesome ribes seed germination in this control unit. The infection survey conducted in 1948 showed the heaviest pine infection in the northwest part of the protection zone above cliffs bordering the campground. The 1949 working included this entire portion, eliminating possible sporidial showers onto the white pine in the campground area below. The crew was moved to Oldman Lake July 5 as previously planned.

Oldman Lake. Work started July 6 continuing until September 9. Acres worked, 520; man-days per acre, 2.06; ribes removed per acre, 310. The chemical method, with trombone pumps applying low chemical concentrates, was used on all heavy ribes areas where water was readily available. On the inaccessible steep slide and cliff areas, Hi-Fog guns were used for spraying a concentrated solution on ribes intermingled with the prostrate pine and fir. All initial ribes eradication in the unit was completed except for 5 acres on a precipitous slide near the south boundary. Ribes on this spot must be eradicated by chemicals in early summer when water is available near the site from melting snow. Back-packing water from below proved too hazardous. A complete systematic check and control status classification was made for the first time. Definite control boundaries were established and the total acreage computed. A check on the total 1,520 acres in the unit showed 480 acres on maintenance and 1,040 acres on rework. Rework includes a large amount so classified because of heavy original ribes population. It also includes all 1949 chemical work as ribes survival cannot be definitely determined until the year following treatment. The 480 acres on maintenance represent the best white pine stand in the control unit.

Conclusion. Glacier National Park white pine blister rust control program is on schedule as outlined in the 1948 annual report. Destroying ribes with 2,4,5-T has proven successful at substantially reduced costs. A saving of 8 man-days per acre resulted from using the chemical on 46 acres of heavy ribes concentrations in the Oldman Lake area. Savings to a lesser degree were also evident in all other chemically treated areas. Where hand eradication methods are applicable, the one-man dragline system has proven most efficient.

RECOMMENDATIONS

Two Medicine. This is the only area scheduled for ribes eradication in 1950. A small maintenance crew will be needed for a complete 3-month period beginning about June 12, composed of six experienced men and one experienced superintendent (SP-7). The camp superintendent will perform all checking work necessary. Using chemical and one-man dragline methods, necessary rework is to be performed as shown by the 1947 check and control status data.

RESULTS

The following tables show statements of expenditures, results of the 1949 field work and accumulative results of all work performed to date:

TABLE 1

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1949
GLACIER NATIONAL PARK

Item	National Park Service
Personal Services	\$21,699.95
Travel & Transportation	78.08
Communication Service	7.30
Other Structural Services	5,808.21
Supplies & Materials	453.05
Equipment	1,595.70
Checker's Salary	863.77
Total	\$30,506.06

TABLE 2

SUMMARY OF RIBES ERADICATION, 1949
GLACIER NATIONAL PARK

Area	Working	Acres	Man-Days	Ribes Species			Total Ribes	Gallons Spray	Per Acre	
				Ribes lacustre	Ribes viscosissimum	Ribes setosum			Man-Days	Ribes
East Glacier	Other	200	272	14,364	913	5,053	20,330	25	1.36	102
Oldman Lake	First	370	845	134,521	204	2,175	136,900	3,297	2.28	370
	Second	150	224	24,370			24,370	152	1.49	162
	Total	520	1,069	158,891	204	2,175	161,270	3,449	2.06	310
All Areas	First	370	845	134,521	204	2,175	136,900	3,297	2.28	370
	Second	150	224	24,370			24,370	152	1.49	162
	Other	200	272	14,364	913	5,053	20,330	25	1.36	102
	Total	720	1,341	173,255	1,117	7,228	181,600	3,474	1.86	252

TABLE 3

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1939-1949
GLACIER NATIONAL PARK

Class	Acres	Man-Days	Total Ribes	Gallons Spray	Per Acre	
					Man-Days	Ribes
NP-Reg.	5,919	7,298	721,342	3,474	1.23	122
NP-CCC	2,633	2,833	323,841		1.08	123
NP-CPS	2,776	2,285	214,156		.82	77
Total	11,328	12,416	1,259,339	3,474	1.10	111

TABLE 4

SUMMARY OF RIBES ERADICATION, 1939-1949
GLACIER NATIONAL PARK

Area	Working	Acres	Man-Days	Ribes Species				Total Ribes	Gallons Spray	Per Acre	
				Ribes lacustre	Ribes viscosissimum	Ribes setosum	Ribes inerme			Man-Days	Ribes
Park Headquarters	First	690	450	32,738	43,176	32,986		108,900		.65	158
	Second	619	201	3,277	2,518	1,195	2	6,992		.32	11
	Other	701	379	6,660	5,064	3,284		15,008		.54	21
	Total	2,010	1,030	42,675	50,758	37,465	2	130,900		.51	65
Two Medicine	First	707	1,243	74,509	4,193	6,388	23,072	108,162		1.76	153
	Second	685	739	84,693	2,498	4,631	33,679	125,501		1.08	183
	Other	366	340	52,188	1,501		12,596	66,285		.93	181
	Total	1,758	2,322	211,390	8,192	11,019	69,347	299,948		1.32	171
Lake McDonald	First	1,777	1,201	43,036	4,289	35,777		83,102		.68	47
	Second	1,777	1,080	29,142	15,455	19,211		63,808		.61	36
	Other	1,216	849	13,121	1,126	1,843		16,090		.70	13
	Total	4,770	3,130	85,299	20,870	56,831		163,000		.66	34
East Glacier	First	446	1,289	46,129	15,236	11,712	111,862	184,939		2.89	415
	Second	388	720	37,434	5,497	30,577	2,385	75,893		1.86	196
	Other	286	446	27,737	1,491	6,686	275	36,189	25	1.56	127
	Total	1,120	2,455	111,300	22,224	48,975	114,522	297,021	25	2.19	265
Oldman Lake	First	1,520	3,255	341,175	306	2,619		344,100	3,297	2.14	226
	Second	150	224	24,370				24,370	152	1.49	162
	Total	1,670	3,479	365,545	306	2,619		368,470	3,449	2.08	221
All Areas	First	5,140	7,438	537,587	67,200	89,482	134,934	829,203	3,297	1.45	161
	Second	3,619	2,964	178,916	25,968	55,614	36,066	296,564	152	.82	82
	Other	2,569	2,014	99,706	9,182	11,813	12,871	133,572	25	.78	52
	Total	11,328	12,416	816,209	102,350	156,909	183,871	1,259,339	3,474	1.10	111



W 603

Oldman Lake unit: West end of white pine blister rust control area. Boundary on continental divide in background. Blister rust camp lower left portion of picture.



W 589

Oldman Lake unit: Mt. Morgan and Cut Bank Pass with cliff areas worked in 1943. The prostrate pine growths appearing on the cliff ledges contain heavy ribes concentrations.



W 600

Oldman Lake unit: Main portion of area showing excellent stand of Pinus Albicaulis (white bark pine). Outlet of Oldman Lake at right. Lower or Boy Lake just visible in center background.



W 607

Oldman Lake unit: Lower or Boy Lake with cliff and precipitous areas in background. Worked in 1949 using hand and chemical methods (Hi-Fog guns). Patches of prostrate growth of white bark pine contain heavy ribes concentrations. White bark pine tops in foreground.



W 608

Oldman Lake unit: Mature Pinus Albicaulis (white bark pine) representing the stand composition of main pine area shown in picture W 600.



W 624

Hi-Fog Gun spraying: Used extensively on Oldman Lake unit to treat ribes on precipitous slopes and cliffs during 1949.

BLISTER RUST CONTROL, YELLOWSTONE NATIONAL PARK, 1949

By

J. C. Gynn, Operation Supervisor

C. M. Chapman, Pathologist

The 1949 blister rust control program in Yellowstone National Park was confined to ribes eradication and checking in the Mount Washburn area. Nineteen hundred acres were worked with an average of 1.02 man-days per acre and 214 ribes per acre. Work started June 13 and continued until September 10. The crew averaged 35 men, 1 experienced superintendent, and 1 experienced checker.

Chemical methods of ribes eradication were used on all stream type and heavy ribes concentrations in the upland at a greatly reduced cost. The hormone chemical 2,4,5-T was in adequate supply for the 1949 program, and for the first time a practical chemical was available that would kill all species of ribes encountered in the park. Two means of applying chemical were employed. Stream type ribes were sprayed with a dilute solution of 2,4,5-T using knapsack units with manually-operated trombone pumps. The same chemical in a more concentrated solution was applied to upland Ribes montigenum clumps with Hi-Fog guns. By using Hi-Fog guns in combination with the one-man dragline method in the upland, production was increased 40 percent over previous years. This represents an average saving of six-tenths of a man-day for every acre worked in 1949. Effectiveness of the one-man dragline method in finding the ribes where they are more scattered made it possible to place a large part of the area worked in 1949 on maintenance. All 1949 objectives would have been accomplished except for time lost to fire suppression.

CHECKING AND CONTROL STATUS

After a complete systematic check, the 1949 work area was classified as follows: Maintenance, 735 acres; post check, 142 acres; rework, 1,023 acres. Rework includes all sprayed areas, as ribes survival cannot be determined until the year following treatment.

A post check on 218 acres worked in 1947 showed 188 acres to be on maintenance and 130 acres in the rework category.

The 4,700 acres comprising the Mount Washburn unit are now classified for control status as follows: Maintenance, 1,190 acres; post check, 1,311 acres; rework, 1,799 acres; unworked, 400 acres. Much of the area classified for rework and post check can be brought to maintenance standards at a minimum cost.

BLISTER RUST INFECTION

Blister rust infection was found on white pine in the Sunlight Creek drainage just 2 miles north of the Yellowstone National Park boundary in 1949. This is approximately 200 miles nearer the park than any previously known pine infection center. The disease was not found on white pine in the park. Blister rust infection on ribes was found for the first time on Stevens Creek near Park Headquarters and on Elk Creek near Tower Falls ranger station. Ribes and white pine were examined for the rust in 22 other park drainages with negative results.

RECOMMENDATIONS

The 1949 ribes eradication program was interrupted at its peak of production. Controlling many fires occurring in the park required the assistance of all blister rust workers. Approximately 500 man-days were lost by the blister rust project during this period. For this reason, the rework and 400 acres of initial work planned for 1949 were not completed. The following 1950 estimate is made accordingly to complete initial and necessary rework as scheduled in 1948:

For a complete 3-month period starting approximately June 12, a crew of 25 men, 1 superintendent (SP-7) and 1 checker (SP-6). Work plan: (1) Using chemical and dragline methods, complete the 400 acres of initial work remaining; check 1949 chemical work; (2) check all areas classified prior to 1949 as on post check; (3) perform all rework as indicated by the latest checking and control status data.

RESULTS

The following tables show statements of expenditures, results of the 1949 field work and accumulative results of all work performed to date:

TABLE 1

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1949 YELLOWSTONE NATIONAL PARK

Item	National Park Service
Personal Services	\$28,325.94
Travel & Transportation	5.80
Communication Service	8.16
Contractual Services	1,288.59
Supplies & Materials	2,217.87
Equipment	986.30
Checker's Salary	995.34
Total	\$33,828.00

TABLE 2

SUMMARY OF RIBES ERADICATION, 1949
YELLOWSTONE NATIONAL PARK

Area	Working	Acres	Man-Days	Ribes Species					Total Ribes	Gallons Spray	Per Acre	
				Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes inerme	Ribes montigenum			Man-Days	Ribes
Mount Washburn	First	1,820	1,900	242,502	17,117	1,411	32,306	111,664	405,000	6,313	1.04	223
	Second	80	39	913	17			70	1,000		.49	13
	Total	1,900	1,939	243,415	17,134	1,411	32,306	111,734	406,000	6,313	1.02	214

TABLE 3

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1945-1949
YELLOWSTONE NATIONAL PARK

Class	Acres	Man-Days	Total Ribes	Gallons Spray	Per Acre	
					Man-Days	Ribes
NP-Reg.	9,343	7,374	1,055,817	11,140	.79	113
NP-CPS	1,567	992	95,769	765	.63	61
Total	10,910	8,366	1,151,586	11,905	.77	106

TABLE 4

SUMMARY OF RIBES ERADICATION, 1945-1949
YELLOWSTONE NATIONAL PARK

Area	Working	Acres	Man-Days	Ribes Species							Total Ribes	Gallons Spray	Per Acre	
				Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes inerme	Ribes setosum	Ribes cereum	Ribes montigenum			Man-Days	Ribes
Mammoth	First	1,580	1,040	8,322	2,331	19,190		63,001	12,215		105,059	1,646	.66	66
	Second	1,478	563	6,286	1,727	8,002		55,042	4,083		75,140	736	.38	51
	Other	152	204		417	4,090		12,880	1,567		18,954	409	1.34	125
	Total	3,210	1,807	14,608	4,475	31,282		130,923	17,865		199,153	2,791	.56	62
Mount Washburn	First	4,300	6,128	371,494	20,998	21,337	32,687			482,434	928,950	9,114	1.43	216
	Second	80	39	913	17					70	1,000		.49	13
	Total	4,380	6,167	372,407	21,015	21,337	32,687			482,504	929,950	9,114	1.41	212
Craig Pass	First	3,320	392	7,599	2,962		2,340			9,582	22,483		.12	7
All Areas	First	9,200	7,560	387,415	26,291	40,527	35,027	63,001	12,215	492,016	1,056,492	10,760	.82	115
	Second	1,558	602	7,199	1,744	8,002		55,042	4,083	70	76,140	736	.39	49
	Other	152	204		417	4,090		12,880	1,567		18,954	409	1.34	125
	Total	10,910	8,366	394,614	28,452	52,619	35,027	130,923	17,865	492,086	1,151,586	11,905	.77	106

BLISTER RUST CONTROL, ROCKY MOUNTAIN NATIONAL PARK, 1949

By

J. C. Gynn, Operation Supervisor

C. M. Chapman, Pathologist

The 16 chemical ribes eradication plots established in Rocky Mountain National Park during 1948 were inspected in June and July 1949 with the following results: The species Ribes montigenum, R. coloradense, R. lacustre, and R. setosum proved highly susceptible to the hormone chemical 2,4,5-T. Resprouting from the crown was occurring on approximately one-half of the large multistemmed R. cereum. All other ribes appeared dead at time of inspection. It is believed insufficient chemical was applied to the crown area of the surviving ribes.

Since making the tests, recent improvements in spraying equipment and application techniques insure an adequate application of chemical to the ribes crowns. This will alleviate the obstacle encountered on the large crowned bushes.

RECOMMENDATIONS

The chemical and one-man dragline methods first used in this region in 1948 and 1949 are particularly well suited for ribes eradication work on nearly all of the Longs Peak-Estes Cone control unit. These methods should be employed to obtain the protection desired for the lowest possible cost.

Work should be started at the south boundary of the control unit in the vicinity of Longs Peak campground progressing north in a contiguous block.

The following estimate is made for 1950 for the proposed Rocky Mountain National Park blister rust control program: For a complete 3-month period on a 6-day week basis beginning approximately June 12, a crew of 35 men, 1 foreman (SP-6), 1 checker (SP-6), and 1 superintendent (SP-7).

To assure obtaining the total estimated effective man-days possible during the working period, it is recommended five additional laborers be hired at the start to take care of time lost from rain, fire, crew reductions, and other unforeseen circumstances.

If the above program is carried out, initial ribes eradication should be completed on the 2,700 acres comprising the south half of the control unit in 1950. This is the highly used area south of the Estes Cone-Battle Mountain ridge.

SPREAD OF WHITE PINE BLISTER RUST

Scouting in Montana, Wyoming, and Idaho, 1949

By J. C. Gynn and C. M. Chapman

Extensive scouting for white pine blister rust was done in nine National Forests, two National Parks, and one Indian Reservation. Infected white pine were located for the first time in three Montana counties. The infection was in the juvenile and pycnial stages on small Pinus flexilis or P. albicaulis. Associated ribes that probably carried the rust to the pine are Ribes petiolare in Park and Madison Counties and R. viscosissimum in Lewis and Clark County. The locations are as follows:

1. Park County, Sunlight Creek, Gallatin National Forest, Montana; 2 miles north of Yellowstone National Park.
2. Madison County, Trail Fork of Bear Creek, Gallatin National Forest, Montana; 19 miles northwest of Yellowstone National Park. Ribes infection was found in this drainage in 1937.
3. Lewis and Clark County, McDonald Pass on the Continental Divide, Helena National Forest, Montana; 17 miles west of Helena, Montana.

Infected R. petiolare were found for the first time in 10 additional drainages and in 3 additional counties, Lemhi County, Idaho, and Park County and Freemont County, Wyoming. The locations are as follows:

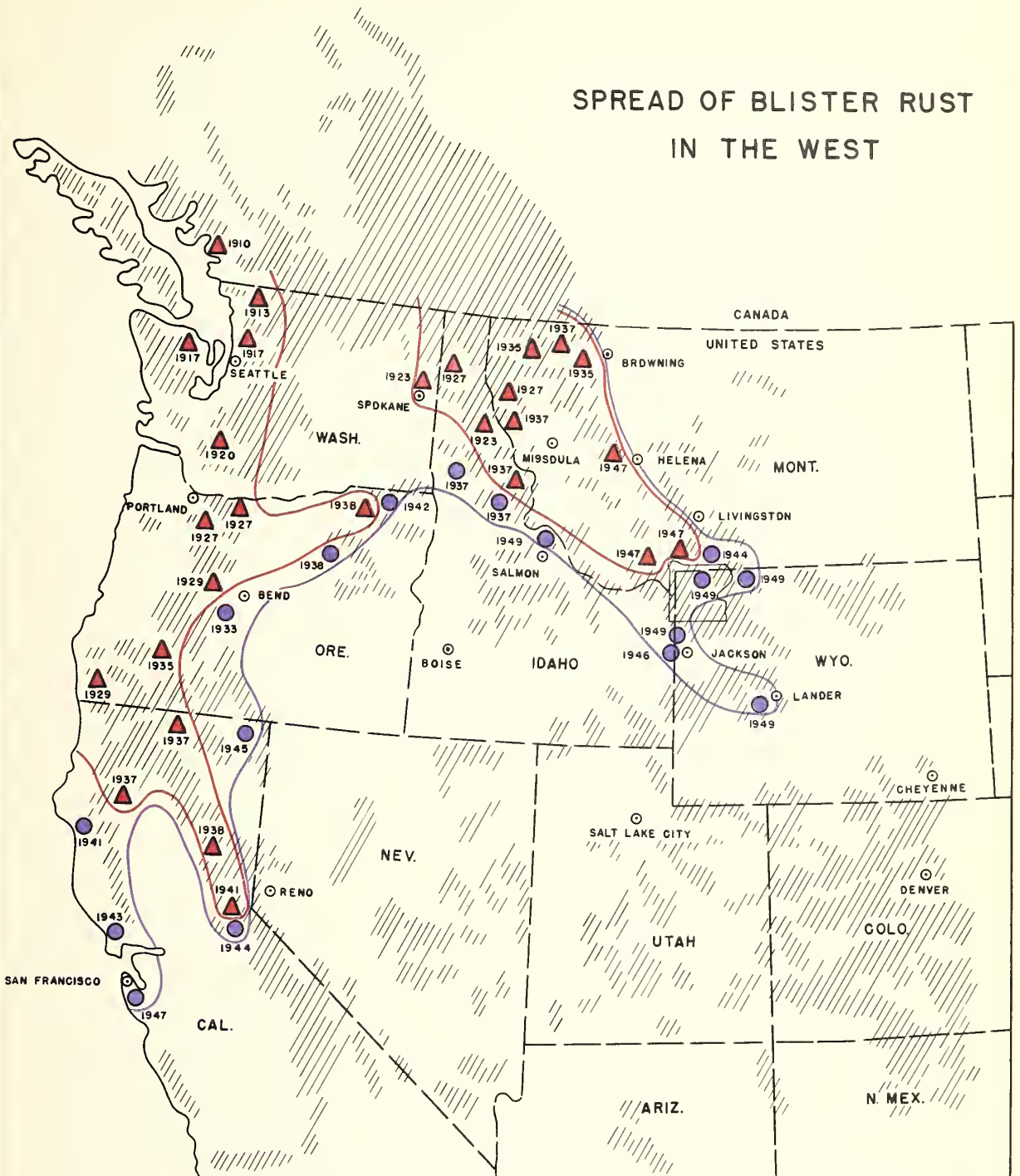
1. Lemhi County, Salmon River, Salmon National Forest, Idaho; between Salmon, Idaho, and Hamilton, Montana.
2. Park County, Muddy Creek, Shoshone National Forest, Wyoming; 12 miles east of Yellowstone National Park and 38 miles east of previously found infection inside the National Park boundary.
3. Freemont County, Popo Aggie River, Washakie National Forest, Wyoming; 12 miles west of Lander, Wyoming. This center is 50 miles south and 100 miles east of the nearest known infection which was found in 1946 near Jackson, Wyoming.
4. Teton County, Darby Creek, Targhee National Forest, Wyoming; 6 miles west of Grand Teton National Park. Infection in this county was first found in 1946.
5. The six additional drainages in which ribes infection was found for the first time are adjacent to previously reported blister rust infection in the Gallatin National Forest, Deerlodge National Forest, and Yellowstone National Park.

SCOUTING SUMMARY, 1949

MONTANA, WYOMING, IDAHO

Forest Unit	Drainages Sampled	Ribes Examined	Pine Examined	New Ribes Infection Centers	New Pine Infection Centers
Yellowstone NP, Wyo.	24	1,332	12,885	2	
Shoshone NF, Wyo.	9	236	135	1	
Washakie NF, Wyo.	3	310	125	1	
Wind River IR, Wyo.	1	81	17		
Teton NF, Wyo.	4	507	123		
Grand Teton NP, Wyo.	4	490	330		
Targhee NF, Wyo. & Idaho	2	775	52	1	
Salmon NF, Idaho	1	20	15	1	
Gallatin NF, Mont.	10	357	1,288	2	2
Bitterroot NF, Mont.	1	30	10		
Deerlodge NF, Mont.	2	40		2	
Helena NF, Mont.	1	36	4		1
Total	62	4,214	14,984	10	3

SPREAD OF BLISTER RUST IN THE WEST



LEGEND

- ▲ (1910) PINE INFECTION AND YEAR OF ORIGIN
- (1949) RIBES INFECTION AND YEAR FOUND
- BOUNDARY OF INFECTION ON PINE
- BOUNDARY OF INFECTION ON RIBES
- //// WHITE PINE
- STATE LINES

DEVELOPMENTAL WORK IN METHODS OF RIBES ERADICATION, AND PROGRESS OF RIBES
ECOLOGY AND DISEASE CONTROL STUDIES IN THE NORTHWESTERN REGION FOR 1949

By

V. D. Moss, Forest Ecologist, and H. R. Offord, Pathologist

SECTION 1

SUMMARY OF PROJECT WORK FOR 1949 AND RECOMMENDATIONS FOR USE OF CHEMICALS

Project work included (1) first tests in spraying ribes and brush with 2,4,5-T by helicopter in the Northwestern Region, (2) establishing a series of tests to compare the effectiveness of 2,4,5-T spray with "Brush Killer 32," a commercial mixture of 2,4,5-T and 2,4-D, (3) investigating some antibiotics in treating blister rust cankers, (4) establishing a series of dosage and concentration tests of 2,4,5-T with a Buffalo turbine blower, (5) devoting as much time and study as possible in assisting the control operations with chemical spray methods, and (6) maintaining ribes ecology and timber management studies.

In the development and improvement of control methods, these are the results of chemical tests in 1948: (1) Ribes laxiflorum, acerifolium, watsonianum, and bracteosum can be added to the list of ribes species susceptible to 2,4,5-T; (2) the most effective chemical formulation is an ester of 2,4,5-T plus an agricultural oil emulsion; (3) effective results from spraying still require that crowns, stems, leaves, and growing stem tips of mature bushes be treated; seedlings can be sprayed broadcast; (4) minimum concentration of 2,4,5-T for knapsack and power spraying is 2,000 p.p.m. acid equivalent, and 20,000 p.p.m. for Hi-Fog gun or mist spraying; (5) with dosages recommended for field use, ultimate toxicity of 2,4,5-T does not appear to be significantly modified by seasonal changes in growth development of ribes between May 15 and September 1, nor by differences in site during the normal growing season; (6) the year after treatment ribes in significant numbers continue to die until about July 1 regardless of the date when sprayed the previous season; (7) respraying should not commence until July at the earliest; and (8) for treating cut surfaces of decapitated ribes a 5 percent solution of 2,4,5-T in either Diesel oil or fuel oil should be used.

Spraying ribes and brush with 2,4,5-T by helicopter appears to be a feasible method of eradicating ribes seedlings and in preparing brush fields for broadcast burning. The apparent kill of ribes and brush is correlated closely with the density and uniformity of spray deposit as determined by test plates. Two treatments about a year apart will be required to kill ribes originally under more than 4/10 brush density. Spray deposit on ribes under less than 4/10 brush density was significantly better with a 10-gallon dosage than with 5 gallons of solution per acre. In dense growth, about as much brush live stem was killed with one dosage as another. The apparent kill of ribes and brush 3 months after spraying appeared comparable for the rates of 1, 2, and 3 pounds of 2,4,5-T acid per acre. There was no advantage of Diesel oil over the water-emulsifiable oil formulation of 2,4,5-T. The latter was less damaging to conifers.

The need for some type of power rig to spray broadcast at low cost the heavy populations of ribes along roads and skid trails comes closest to being filled

by the turbine blower. A series of dosage and concentration tests of 2,4,5-T applied by blower were made in the Clearwater and St. Joe forests. Project work with the turbine blower was in cooperation with the control operations. Single run spray applications were compared with double runs from opposite directions. The results this fall indicated that ribes could be satisfactorily killed along roads for a distance close to 1 chain in width. Where brush growth is dense, it will probably require two or more applications about a year apart to kill ribes.

Two chemicals were tested as possible antibiotics for killing or retarding white pine blister rust cankers. One is known as "actidione," and the other, the zinc salt of 2,4,5-trichlorophenol. These were applied in low concentrations of aqueous spray. These fungicides were combined with various penetrants and spreaders. An inspection in October showed a heavy casting of needles 2 years and older, and in some instances, the retardation of pycniaspore production.

Project work in ribes ecology and western white pine management was about the same as in 1948. This included the maintenance of field plots and cooperating with Federal, State, and private forest interest in the study of slash disposal measures and cutting practices. More data were accumulated to show the extent and rapidity with which ribes seeds are devitalized after logging and fire have altered the storage environment of the forest floor. A preliminary survey was made of the Bear Paw timber sale area preparatory to establishing a series of ribes regeneration studies in 1950. This will afford an opportunity to study ribes regeneration after both a first and second cutting in an immature stand of timber.

RECOMMENDATIONS FOR THE USE OF CHEMICALS IN RIBES ERADICATION

These instructions are based on data available through the 1949 field season. They supplement and in a few instances modify slightly the previous recommendations on the use of chemicals given in annual reports and in memoranda on eradication methods. Further instructions may be given early in June of 1950 after examining the 1949 tests if anything of importance develops. Details in the use of the turbine blower for spraying along roadways and skid trails will be written up after checking the results of tests in 1949.

I. Chemical

For all ribes species, use the isopropyl ester of 2,4,5-T (40 percent or more, water and oil miscible solution). Other 2,4,5-T esters or mixtures of 2,4,5-T esters can be used with equal effectiveness on ribes when fluid ounces of stock proprietary material are adjusted for the amount of acid equivalent of 2,4,5-T.

Volume of stock proprietary material needed, based on 3-1/3 lbs. of acid per gallon of the isopropyl ester of 2,4,5-T, to mix 10 gallons of spray solution at recommended strengths is as follows:

<u>P.P.M.</u>	<u>Fluid Ounces of Stock</u>
	<u>2,4,5-T for 10 gal. of Spray</u>
2,000	7.6
2,500	9.5
3,000	11.4

II. Types of Treatments

1. Initial Spray

- a. Dilute aqueous spray of 2,4,5-T applied with conventional sprayers; use 2,000 p.p.m. acid equivalent for seedlings, and 2,500 p.p.m. acid equivalent for mature ribes to August 1; thereafter, raise concentration to 3,000 p.p.m. acid equivalent. Add 1 percent agricultural spray oil emulsion (flowable) to aqueous ester formulations.
- b. Concentrates in water or oil applied with Hi-Fog gun or other low volume sprayers; use 5 percent by volume of the stock solution (about 20,000 p.p.m. acid equivalent) with water or oil (Diesel or fuel) as a diluent until August 15; thereafter, use 10 percent (about 40,000 p.p.m. acid equivalent) 2,4,5-T in oil. Add 5 percent oil emulsion to the water formulations.

2. Respray

- a. Dilute aqueous spray applied with conventional sprayers. During entire season use 3,000 p.p.m. adding 1 percent agricultural spray oil emulsion.
- b. Concentrates in water or oil applied with Hi-Fog gun or other low volume sprayers; same as for initial spraying.

3. Decapitation

Use a 5 percent solution of the ester in Diesel or fuel oil. Carry the concentrate in a small oil can or similar dispenser of metal. Don't allow the use of glass containers because, if accidentally broken, a serious injury might result.

III. How to Treat

1. Spraying

Wet ground about root centers with dilute aqueous spray to insure coverage of all adventitious buds and crown tissue, especially on large old bushes. A concentrate should be directly applied on root center. Kick away debris and scarify cambium tissue of large crown centers before applying spray. Where a mantle of organic material covers roots of layering ribes, lift mat of stems and shake free of debris before spraying. Cover thoroughly all stems, leaves, and growing stem tips with chemical solution.

In broadcast spraying, direct stream at an angle of less than 45° from ground surface toward ribes site or ribes clump so solution will reach stems and root crowns. Finish by applying spray downward over top of ribes clump or site.

2. Decapitation

Always cut through crown, or cut all canes as close to it as possible. Apply enough liquid concentrate to wet all cut surface of crown or canes, using enough solution to give a generous run-off onto crown where it is necessary to treat short stubs of canes. Wet all adventitious buds and exposed crown tissue.

IV. When to Treat

1. Initial Spray

Wait until more than three-fourths of flowers on racemes are in bloom, leaves on 1-year-old wood or older mostly expanded, and current stem growth more than half extended regardless of age class or size of bushes. Start spraying where growth is most advanced due to warm site or low elevation. Continue to spray until September 1, but get most of the work done in June and July while ribes are actively growing.

2. Respray

Wait until after July 1 for spraying the year following initial treatment, and preferably until an inspection shows all sprouts have appeared and are large enough to be easily found. If reworking the area is not too pressing a problem, defer respraying until the second season, then follow the spray schedule given for initial work.

3. Decapitation

Ribes may be treated by this method any time during the field season.

SECTION 2

IMPROVEMENT OF CHEMICAL METHODS FOR RIBES ERADICATION RESULTS OF NEW HERBICIDES TESTED IN 1948

Object of chemical tests in 1948 was to determine (1) whether the effectiveness of 2,4,5-T varied with seasonal changes in the growth development of ribes, (2) the comparative results in applying a 2,4,5-T concentrate in a low volume dosage as against a spray of low concentration applied in large volume, (3) whether any part of the required amount of 2,4,5-T could be replaced by the cheaper material 2,4-D in a combination spray, and (4) the most suitable type of diluent and spreader material for both high volume and low dosage spraying.

The results of applying aqueous solutions of 2,4,5-T with various spreader materials by the knapsack sprayer are given in table 1. Treatments of R. lacustre and R. viscosissimum began in June and were replicated through the season until September. All plots were of the same size, 1 milacre or 1/1000 of an acre. The dosage rate was 1 gallon per milacre plot. Conclusions from these tests are (1) 2,000 p.p.m. of 2,4,5-T is considered the minimum concentration for practical application, (2) an oil emulsion should be added as a spreader material to the aqueous solution of 2,4,5-T, and (3) comparable results in applying 2,4,5-T can be obtained throughout the growing season between the dates June 1 and September 1.

After August 1, the concentration of 2,4,5-T should be raised to 3,000 p.p.m. as a precautionary measure against undertreatment at the time bushes are beginning to prepare for winter dormancy. From June 1 to August 1, the concentration of 2,4,5-T can be lowered to 2,000 p.p.m. for seedlings and 2,500 p.p.m. for mature bushes of both ribes species.

TABLE 1

RESULTS OF 1948 CHEMICAL TESTS OF AQUEOUS 2,4,5-T SOLUTION APPLIED WITH THE KNAPSACK SPRAYER

Plot Nos.	Date Sprayed	Ribes Species	Spreader	Parts Per Million						
				500	1,000	1,500	2,000	3,000	4,000	5,000
				(No. Bushes) - Percent Bushes Killed						
1-3	6/2	<u>R. viscosissimum</u>	Tergitol	(19) 79.0	(22) 100		(21) 100			
10-13	6/15		Tergitol	(42) 97.7	(21) 95.2	(15) 100	(41) 100			
36-39	6/29		Tergitol	(37) 100	(42) 100	(45) 100	(83) 100			
57-60	7/21		none		(12) 100		(19) 100	(16) 100	(5) 100	
61-64	7/21		oil emulsion		(9) 100		(14) 100	(5) 100	(22) 100	
74-77	7/22		none		(21) 100		(29) 100	(14) 100	(13) 100	
97-100	7/31		none		(26) 77.0		(28) 100	(19) 100	(21) 100	
101-104	7/31		oil emulsion		(47) 100		(61) 100	(54) 100	(44) 100	
119-122	8/16		Tergitol		(18) 88.9		(17) 100	(15) 100	(23) 100	
123-126	8/16		oil emulsion		(17) 100		(15) 100	(9) 100	(11) 100	
127-130	8/16	<u>R. lacustre</u>	Tergitol		(9) 77.8		(23) 100	(19) 100	(20) 100	
160-163	9/1		Tergitol		(19) 57.9		(31) 83.8	(21) 100	(27) 100	
164-167	9/1		oil emulsion		(52) 69.2		(25) 96.0	(34) 100	(43) 97.7	
4-9	6/3		Tergitol	(8) 87.5	(5) 100		(4) 100	(11) 100	(5) 100	(7) 100
15-18	6/17		Tergitol	(4) 100	(3) 100	(4) 100	(5) 100			
32-35	6/28		Tergitol	(7) 85.7	(7) 100	(6) 100	(11) 100			
57-60	7/21		none		(16) 56.3		(8) 100	(6) 100	(7) 100	
61-64	7/21		oil emulsion		(13) 53.8		(10) 80.0	(4) 100	(7) 100	
74-77	7/22		none		(15) 66.7		(6) 100	(11) 100	(17) 100	
78-81	7/30		none		(5) 100		(5) 100	(6) 100	(5) 100	
82-85	7/30	<u>R. inerme</u>	oil emulsion		(5) 100		(6) 100	(4) 100	(6) 100	
119-122	8/16		Tergitol		(21) 66.7		(11) 100	(16) 100	(9) 100	
123-126	8/16		oil emulsion		(13) 100		(16) 100	(7) 100	(9) 100	
127-130	8/16		Tergitol		(6) 66.7		(1) 100	(4) 100	(3) 100	
141-144	8/31		Tergitol		(7) 14.3		(5) 60.0	(5) 80.0	(8) 62.5	
145-148	8/31		oil emulsion		(4) 100		(6) 100	(7) 100	(6) 100	
139-140	8/19		oil emulsion				(40) 95.0		(40) 97.5	

TABLE 2

RESULTS OF COMBINATION TESTS OF 2,4,5-T AND 2,4-D
AQUEOUS SPRAY APPLIED WITH THE KNAPSACK SPRAYER

Date Sprayed	PPM = $\frac{2,4,5-T}{2,4-D}$ (No. Bushes) Percent Bush Kill									
	500	500	500	500	1000	1000	1000	1000	1000	2000
500	500	1000	500	500	500	1000	1000	1000	3000	5000
500	500	1000	500	500	500	1000	1000	1000	3000	5000
<u>Ribes viscosissimum</u>										
6/15	(43) 90.6									
6/29	(36) 97.2	(47) 100	(44) 100			(56) 98.2			(53) 100	(67) 100
7/31	(21) 90.4				(32) 96.8	(24) 91.6	(27) 96.2			(23) 100
9/1	(32) 43.5	(48) 43.5			(34) 67.6	(31) 90.3	(42) 59.5			
<u>Ribes lacustre</u>										
6/17	(5) 60.0	(7) 100	(5) 100			(3) 100			(4) 100	(4) 100
7/30	(6) 66.7	(4) 75.0			(5) 100	(4) 100	(3) 100			
8/31	(4) 0	(5) 0			(4) 0	(4) 25.0	(4) 0			

The results in combining 2,4,5-T and 2,4-D as a mixed spray are shown in table 2. This series of plots was established to compare similar concentrations of 2,4,5-T with and without the addition of 2,4-D. Size of plot and dosage rate were the same in both instances. The computations show that for a total acid content of 3,000 p.p.m. or less, 2,4,5-T is less effective in combination with 2,4-D than when used alone. The mixed spray takes the characteristic of 2,4-D in being significantly less effective than 2,4,5-T alone on R. lacustre and R. viscosissimum after new growth has fully developed.

By comparison with knapsack spraying, the results in applying 2,4,5-T concentrates with the Hi-Fog gun are shown in table 3. Interest in these tests was between differences in concentration of 2,4,5-T, diluents, and season or growth stage of ribes when treated. These are the conclusions: (1) water plus 5 percent oil emulsion is as good a diluent as Diesel oil during the regular spray season, (2) Diesel oil should be used in late fall when night temperatures begin to drop below freezing when the acid tends to precipitate from solution, and (3) with low volume treatment the concentration of 2,4,5-T should never drop below 20,000 p.p.m. For late season work after August 15, the concentration of 2,4,5-T should be raised to 40,000 p.p.m. Failure in killing all bushes with the water plus oil emulsion formulation of 2,4,5-T at 20,000 p.p.m. or higher lies in the fact that root crowns were not adequately drenched. This is difficult to accomplish where R. viscosissimum grows in large numbers, and where the root centers of the trailing type R. lacustre cannot easily be found. Results will be better in both instances if the knapsack or power sprayers for large volume dosages are used instead of the Hi-Fog gun.

TABLE 3

RESULTS OF APPLYING 2,4,5-T CONCENTRATE SPRAY WITH THE HI-FOG GUN

Plot Nos.	Date Sprayed	Ribes Species	Diluent	Parts Per Million			
				43,000	21,500	14,333	10,750
25-27	6/18	R. lacustre	Fuel Oil	(No. Bushes)	Percent Bush Kill		
28-30	6/18		Fuel Oil & TBP		(20) 95.0	(20) 90.0	(20) 95.0
31	6/18		Water		(20) 100		
65 & 67	7/21		H ₂ O & 10% Oil	(23) 95.6	(21) 95.2		
66	7/21		H ₂ O & 5% Oil		(25) 92.0		
68-69	7/21		Fuel Oil	(20) 100	(21) 95.2		
70-71	7/22		Fuel Oil & TBP	(22) 90.8	(20) 95.0		
72-73	7/22		Water	(20) 100	(20) 100		
91-92	7/30		Fuel Oil & TBP	(20) 55.0	(20) 60.0		
93-94	7/30		Fuel Oil	(20) 100	(20) 95.0		
95-96	7/30		H ₂ O & 5% Oil	(20) 90.0	(20) 90.0		
131-132	8/17		Fuel Oil	(7) 100	(9) 88.9		
133-134	8/17		Fuel Oil & TBP	(15) 73.2	(10) 90.0		
135-136	8/17		Water	(6) 100	(10) 80.0		
137-138	8/17		H ₂ O & 5% Oil	(9) 100	(12) 100		
154-155	9/2	R. viscosissimum	Fuel Oil	(20) 100	(20) 85.0		
156-157	9/2		Fuel Oil & TBP	(20) 60.0	(20) 85.0		
158-159	9/2		H ₂ O & 5% Oil	(20) 90.0	(20) 85.0		
48-50	6/30		Fuel Oil		(40) 100	(40) 100	
51-53	6/30		Fuel Oil & TBP		(40) 95.0	(40) 100	(40) 97.5
54-56	6/30		Water		(40) 100	(40) 100	(40) 92.5
65 & 67	7/21		H ₂ O & 10% Oil	(25) 100	(15) 100		
66	7/21		H ₂ O & 5% Oil		(20) 100		
68-69	7/21		Fuel Oil	(20) 100	(20) 100		
70-71	7/22		Fuel Oil & TBP	(20) 100	(20) 100		
72-73	7/22		Water	(20) 100	(20) 100		
110-111	7/31		H ₂ O & 5% Oil	(40) 100	(40) 97.5		
112-113	7/31		Fuel Oil	(40) 97.5	(40) 97.5		

(continued on following page)

TABLE 3 (continued)

Plot Nos.	Date Sprayed	Ribes Species	Diluent	Parts Per Million			
				43,000	21,500	14,333	10,750
				(No. Bushes)			
				Percent Bush Kill			
114-115	7/31	R. viscosissimum	Fuel Oil & TBP	(40)	92.5	(40)	90.0
131-132	8/17		Fuel Oil	(25)	100	(20)	100
133-134	8/17		Fuel Oil & TBP	(20)	80.0	(21)	80.0
135-136	8/17		Water	(15)	93.2	(15)	86.7
137-138	8/17		H2O & 5% Oil	(20)	100	(20)	100
173-174	9/1		Fuel Oil	(40)	100	(40)	100
175-176	9/1		Fuel Oil & TBP	(40)	100	(40)	95.0
177-178	9/2		H2O & 5% Oil	(40)	100	(40)	100

When the plots were first examined in May, many bushes were commencing to resprout or contained green cambium in the basal stems and root crowns. After noting how discolored and feeble the resprouts appeared and that most adventitious buds were dead on those bushes with green cambium in basal stems and root crowns, it was decided to re-examine the plots at three intervals during the growing season. A check of live and dead bushes in June, July, and October showed these interesting facts: (1) bushes in significant numbers continue to die until about July 1 regardless of the date when sprayed the previous season, (2) no resprouting was observed after July 1, (3) if all adventitious buds are dead and live stem killed within 6 inches of the root crown, no resprouting occurred, though the crown may stay green throughout the season, and (4) it was obvious that respraying should be delayed until mid-July or later so all resprouting bushes can be easily found and treated. A more desirable time to respray would be in May and June of the second season following initial spraying.

Such materials as tributyl phosphate and Geon 31-X latex added to 2,4,5-T spray to increase penetration or lower the rate of transpiration made a less effective formulation on ribes than a straight aqueous spray of 2,4,5-T. The tributyl phosphate tests are shown in table 3. There were three plots of the Geon 31-X latex series of 750 p.p.m. of 2,4,5-T to which was added 10 percent, 5 percent, and 1 percent latex compound. In plot 116 (10 percent latex), 9 R. viscosissimum and 5 R. lacustre were sprayed; the percent bush kill was 77.8 and 60, respectively. Plot 117 (5 percent latex) contained 8 R. viscosissimum and 7 R. lacustre; the percent bush kill was 87.5 and 42.7. In plot 118 (1 percent latex), 11 R. viscosissimum were sprayed, killing 91.1 percent, and 5 R. lacustre, killing 2 bushes or 40 percent.

HERBICIDES TESTED IN 1949

One newly introduced herbicide was tested on ribes this season: Weedone Brush Killer 32, a commercial mixture combining one and one-third lbs. of 2,4-D acid and two-thirds lb. of 2,4,5-T acid per gallon formulated as the butoxy ethanol esters plus emulsifying and penetrating agents. The object was to compare the effectiveness of this mixture with 2,4,5-T alone and a field mixture of 2,4-D and 2,4,5-T.

Knapsack and Hi-Fog gun tests. The first tests with brush killer 32 were established in the Clearwater Forest July 20. Four plots were sprayed with concentrations of 250, 500, 750, and 1,000 p.p.m. of 2,4,5-T. The concentration of 2,4-D would be approximately twice that of 2,4,5-T contained in brush killer 32. One gallon of spray was applied to each milacre plot. On July 28, 10 plots were established on Potter Creek in the Coeur d'Alene National Forest. Four plots were sprayed with 250, 500, 750, and 1,000 p.p.m. of 2,4,5-T in brush killer 32, and a fifth plot with 500 p.p.m. applied to leaves and stems only. The plots in the concentration series were treated by applying spray to the root crowns, stems, leaves, and growing stem tips of ribes. To compare the effectiveness of brush killer 32 with straight 2,4,5-T and mixed with 2,4-D, tests included three 2,4,5-T concentration plots and two of mixed solution. One of the latter contained 500 p.p.m. of 2,4,5-T and 1,000 p.p.m. of 2,4-D, and the other, 1,000 p.p.m. of 2,4,5-T and 2,000 p.p.m. of 2,4-D. The straight 2,4,5-T concentration tests included a 500 and a 1,000 p.p.m. conventionally applied, and one 500 p.p.m. plot in which spray was applied only to the aerial portion of ribes

bushes. The Potter Creek tests were made on R. viscosissimum. The identical tests were replicated on R. lacustre in Iron Creek July 29. In addition, four concentrate tests were made using 5,000 and 10,000 p.p.m. of 2,4,5-T straight in comparison to that contained in the commercial mixture brush killer 32. On August 3 and 4, the entire series of tests were replicated on LaClerc Creek in the Kaniksu National Forest. These plots contained both ribes species growing on a severe site. The last tests with brush killer 32 for the season in the Coeur d'Alene National Forest were established September 23 on Potter Creek (plot numbers 39 to 42). The concentrations of 5,000 and 10,000 p.p.m. of straight 2,4,5-T were compared with equal amounts contained in brush killer 32. Spray was applied with the Hi-Fog gun. In examining the Coeur d'Alene and Kaniksu plots in October, the only injury observed was the gradual dying-back of live stem typical of the way in which 2,4,5-T commences to kill a bush during the season of treatment.

Buffalo turbine tests. Seven roadside tests of the turbine blower in applying an aqueous solution of 2,4,5-T in the Clearwater Forest were made in cooperation with F. O. Walters, M. C. Riley, and H. J. Faulkner. Two of the seven tests were double runs (the same ground sprayed from opposite directions). The other five plots were sprayed from a single direction. The concentration of 2,4,5-T varied from 1 to 5 percent with 5 percent oil emulsion added as a spreader material for the water formulation. The distance to which the mist spray can be blown depends upon slope, and direction and velocity of wind. On the average, it appears that about $\frac{1}{2}$ chain can be effectively sprayed along the road with the fishtail nozzle. The oval nozzle reaches out from where the fishtail leaves off to about 1 chain distance from the blower. There is every indication from the way ribes are reacting that a satisfactory kill will be obtained. If so, the turbine blower affords a rather inexpensive method of spraying large populations of ribes along roadsides.

Applying 2,4,5-T by helicopter. The initial test in the western white pine region in spraying ribes and brush with 2,4,5-T by helicopter was made from June 21-27 in the Coeur d'Alene National Forest. The study was jointly undertaken by the Forest Service and the Bureau of Entomology and Plant Quarantine. Twelve 2-acre plots were established and treated to study dosage, concentration of 2,4,5-T, and the comparative effectiveness of oil and water diluents. Six of the plots were sprayed with a water-oil emulsion formulation and the other six with the diluent Diesel oil. Two dosage rates were used for each of the diluents, three plots getting 5 gallons of spray per acre and the other three getting 10 gallons. The proprietary material 2,4,5-T was applied at the rates of 1, 2, and 3 lbs. of acid per acre for the 5- and 10-gallon treatments. Final results will be reported in 1950. In the meantime, a special report has been prepared giving in detail methods and techniques employed in spraying by helicopter over mountainous terrain. A table is also included giving an estimate of probable damage to ribes, brush, and conifers. These data were taken 12 weeks after spraying. This special report can be obtained from the U. S. Forest Service, Missoula, Montana, or the Office of Blister Rust Control, Spokane, Washington.

STOCKING-RUST DAMAGE SURVEY, 1949

By

R. T. Bingham, Pathologist

Training school

A 4-day school for training surveymen in the determination of forest stocking as affected by blister rust damage was held at Clarkia, Idaho, Blister Rust Headquarters, June 20 to 23, inclusive. A total of 36 men attended. Included in this number were surveymen, survey party leaders, and supervisory personnel from the blister rust control operations.

Training progressed daily as follows:

First day - Methods of examining white pines for blister rust cankers including blister rust life history, recognition of rust stages on ribes and white pine, dating of blister rust cankers, determination of killing cankers, examination of reproduction and pole size white pine for blister rust and killing cankers, tree climbing, and tree-climbing safety.

Second day - Silvicultural characteristics of western white pine including tolerance, dominance, and ability to express dominance under competition of Inland Empire coniferous tree species. Survey equipment and methods, including special equipment used in survey work, the stocked-quadrat and crop tree concepts, recognition of crop trees, occupancy of stocking quadrats by crop trees, determination of site index, demonstration of survey line examination, and trial runs of short, staked and strung survey lines by individual surveymen.

Third day - Practical application of survey methods and use of survey data forms including examination of 20 to 40 chains of survey lines by survey crews, recording survey line data, summarization of data taken from all lines on the surveyed area, mapping data taken on the surveyed area, and interpretation of the mapped data.

Fourth day - Training in recognition of the symptoms of pole blight of western white pine, conducted by Dr. T. S. Buchanan and Mr. George M. Harvey of the University of Idaho School of Forestry, Department of Forest Pathology.

A "Northwestern Region Stocking-Rust Damage Survey Manual, 1949," prepared in the spring of 1949, was issued to all personnel attending the school.

Report of survey coverage for 1949

Nine parties composed of 41 leaders and surveymen made stocking and rust damage surveys in the 6 blister rust control operations of this region. Approximately 900 miles of survey line were run by the various Forest Service and Bureau of Entomology and Plant Quarantine parties.

Additional survey lines were run in many working units given only preliminary surveys in 1948 to secure more complete information. Many unsurveyed units were also investigated. It is anticipated that the large amount of survey work completed in 1948 and 1949 will make possible a material reduction in the size

and cost of future survey jobs. The work of the last 2 years, approximating 2,000 miles of survey line, has provided most of the white pine stocking and rust damage information needed for completion of unit area analyses.

Methods investigations related to survey work

Mr. C. A. Wellner of the Forest Experiment Station and Mr. D. J. Moore of the Division of Timber Management, U. S. Forest Service, Region 1, cooperated with the office of Blister Rust Control in an investigation of mortality rates among white pine crop trees 60 years or more of age. This work was done to determine whether mortality among such trees as predicted by present survey calculations was substantially correct. Results showed annual percent mortality on the Experiment Station's plots to be close enough to that predicted by survey calculations ($\frac{2}{3}$ of 1 percent per year) so that change in calculating methods was not warranted. These men also prepared a revised yield table to predict timber yields in the western white pine type, for use in unit area analysis.

Periodic field checks were made upon the accuracy of survey results. Of particular interest was the accuracy of the percentage of white pine stocking and the accuracy of the percentage of the white pine stocking lost to blister rust for any given area. In general, the percentages of white pine stocking and rust loss were accurate within plus or minus 15 percent of the percentages themselves in two out of three cases. Investigations to determine whether results of equal reliability could be obtained by widening the interval between survey lines hold some promise for reducing the cost of survey work. On areas several sections or more in size, survey lines at 40 chain intervals gave equally reliable percentages of loss in white pine stocking due to rust. On the same large areas, survey lines at 20 chain intervals gave equally reliable percentages of white pine stocking.

PHOTOGRAPHIC AND EDUCATIONAL WORK, 1949

By

Frank O. Walters, Assistant Regional Leader
H. Miller Cowling, Photographic Specialist

Photographic

The most important field photography this year was recording the initial helicopter spraying work in this region. Every phase of the project was recorded by moving and still pictures. Picture points were established to make a continuous record of the results. This will be an addition to the several other series pictures, which have been carried over a period of years and have proven valuable records.

Cooperation was given agencies carrying on pole blight studies. Pictures were taken of the various phases of the disease in the Coeur d'Alene and Kaniksu National Forests. Pictures were processed for the research laboratories.

Three days were spent in Glacier National Park taking motion and still pictures of all phases of the work. The purpose was to secure pictures for use in the educational and training programs. Duplicate films have been made of the motion pictures to be used for demonstration purposes and for inclusion in the Northwestern Region's film, "A Destructive Invader," when a revision is made.

All maps, tables, and photographs appearing in this report have been processed for printing by the photographic section.

Educational

Two large groups were shown phases of blister rust control in the field. The Timber Products Bureau of the Spokane Chamber of Commerce visited the Forest Service Nursery at Haugan, Montana, and adjacent logging and milling operations. The group saw how white pine seedlings are raised in the nursery and inspected the severe blister rust damage in the unprotected white pine stands in Deer Creek. One luncheon meeting of the Moscow, Idaho, Chamber of Commerce was devoted to blister rust. The film, "A Destructive Invader," was shown. High lights of the problem in Idaho were outlined by the Regional Leader. Later in the week, members of the Chamber were conducted on a tour covering parts of the St. Joe operation where they saw extensive potential white pine resources in plantations and natural pole and reproduction areas. Large scale logging operations brought out the economic importance of the white pine industry.

The new western blister rust film, "A Destructive Invader," has been in almost constant use since it was received. It has had 34 showings with 2,255 people in attendance.

The movie film, "Blister Rust Enemy of the Pines," has been loaned to the film library of the Spokane public schools. It is being used both in the grades and high schools for courses in biology and Washington State history.

A blister rust exhibit at the Sportsmen's Fair in Spokane occupied a prominent place and was viewed by 50,000 people. Use was made of live pine and ribes to indicate the life cycle of the disease. Pictures which had been colored helped to make the booth attractive. An important part of the exhibit was a diorama prepared by the Forest Service. A similar exhibit was on display in Priest River, Idaho, during the log drive celebration. An estimated 6,000 people saw this display.

PHOTOGRAPHIC, MULTILITH, BLACKLINE, AND MIMEOGRAPH WORK

Item	North-western Region	Pacific Coast Region	Total
PHOTOGRAPHIC			
Lantern slides, natural color	192		192
Films developed, field films	109		109
roll film	2		2
packs	2		2
Copies, 5x7	31		31
8x10	129	25	154
Printing, 4x5 or smaller	142	220	362
5x7	1,139		1,139
8x10	252		252
9x11	772	95	867
Enlarging on film		18	18
paper, 5x7		50	50
9x12	34		34
16x20	6	317	323
Total Items	2,810	725	3,535
MULTILITH			
Duplimats	156		156
Plates	183	22	205
Cards	2,000	1,500	3,500
Sheets	72,800	4,000	76,800
Total Prints	74,800	5,500	80,300
BLACKLINE PRINTER			
Total Prints	1,665	64	1,729
MIMEOGRAPH			
Stencils	50		50
Sheets	14,550		14,550
GRAND TOTAL All Items	94,214	6,311	100,525



W-576

Exhibit at the 1949 Spokane Sportsmen's Fair. Diorama at the right prepared by the U. S. Forest Service.

ORGANIZATION OF THE NORTHWESTERN REGIONAL OFFICE - 1949

1. Regional Leader in Charge, H. E. Swanson, Pathologist
2. Assistant Regional Leader, F. O. Walters, Pathologist
3. Cooperative Local Control:
 - a. Clearwater Operation, Idaho:
 - Operation Supervisor, M. C. Riley, Forester
 - Assistant Operation Supervisor, H. J. Faulkner, Forester
 - Camp Superintendent, William Holland, Agent (Fur. eff. 12/1/49)
 - b. St. Joe Operation, Idaho:
 - Operation Supervisor, H. J. Hartman, Forester
 - Assistant Operation Supervisor, W. F. Painter, Pathologist
 - Unit Supervisor, Donald F. Williams, Agent
 - Special Duty Assistant, R. E. Myers, Agent
 - Camp Superintendent, A. E. Turner, Agent (Fur. eff. 10/30/49)
 - c. Coeur d'Alene Operation, Idaho:
 - Operation Supervisor, F. J. Heinrich, Pathologist
 - d. Kaniksu Operation, Idaho-Washington:
 - Operation Supervisor, H. A. Brischle, Pathologist
 - Asst. Operation Super., S. S. Evans, Agent (Trans. to F.S. 2/21/49)
 - Unit Supervisor, L. J. Easley, Agent (Fur. eff. 11/17/49)
 - e. Montana Operation:
 - Operation Supervisor, A. S. Skoglund, Pathologist
 - f. National Parks, Washington-Montana-Wyoming:
 - Operation Supervisor, J. C. Gynn, Pathologist
 - Assistant Operation Supervisor, C. M. Chapman, Pathologist
4. Projects:
 - a. Education and Information:
 - H. M. Cowling, Photographic Specialist
 - J. C. Gonyou, Draftsman
 - b. Disease Survey and Scouting
 - R. T. Bingham, Pathologist
 - c. Methods Development and Control Investigation (BLR 1-6):
 - V. D. Moss, Forest Ecologist
 - J. F. Breakey, Pathologist
 - C. R. Stillinger, Pathologist (Retired 6/30/49)
 - (Personnel assigned to Northwestern Region by H. R. Offord)
5. Business Administration and Clerical:
 - a. S. J. Dorick, Administrative Assistant
 - E. K. LaPrey, Storekeeper
 - L. C. Miller, Automobile Mechanic
 - b. M. L. McWold, Administrative Assistant, Fiscal
 - M. C. Yourt, Clerk
 - c. M. P. Kirsten, Clerk
 - A. B. Treffry, Secretary (Steno.)
 - M. I. Williams, Clerk-Stenographer (Resigned 2/18/49)
 - J. L. Radkey, Clerk-Typist
 - d. L. E. Klatt, Administrative Assistant, Personnel
 - E. E. Smith, Clerk-Stenographer

APPROPRIATIONS
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE
NORTHWESTERN REGION OF BLISTER RUST CONTROL

Regular Appropriations

Fiscal Year 1949:

Project 71.14 NW (Administrative)	\$134,069.00	
Project 73.14 NW (Cooperative)	<u>111,000.00</u>	
		\$245,069.00

Fiscal Year 1950 (as of 12/31/49):

Project W-a.14 NW (Administrative)	\$138,000.00	
Project W-s.14 NW (Cooperative)	<u>107,350.00</u>	
		\$245,350.00

Contributed Funds (deposited with U. S. Treasury)

State of Idaho		\$ 20,000.00	
Clearwater Timber Protective Association	\$6,531.28		
Potlatch Timber Protective Association	5,430.30		
Priest Lake Timber Protective Association	<u>4,055.00</u>	<u>16,016.58</u>	
			\$ 36,016.58

TABLE 1

FEDERAL EXPENDITURES, NORTHWESTERN REGION OF BLISTER RUST CONTROL
CALENDAR YEAR 1949, REGULAR APPROPRIATIONS

Project		Salaries	Expense	Total
January 1 to June 30, 1949				
I	Planning, Coordination, Technical Direction			
1.1	-- Clearwater Operation, Idaho	\$ 6,518.33	\$ 1,509.17	\$ 8,025.50
1.2	- St. Joe Operation, Idaho	8,313.78	5,140.34	13,454.12
1.3	- Coeur d'Alene Operation, Idaho	2,913.81	454.09	3,372.90
1.4	- Kaniksu Operation, Idaho	5,649.15	1,257.06	6,906.21
1.6C	- Cabinet Operation, Montana	1,527.66	299.23	1,826.89
1.6K	- Kootenai Operation, Montana	1,527.67	299.22	1,826.89
1.7	- National Parks	5,186.53	876.50	6,063.03
1.A	- Office Maintenance	16,527.61	5,128.71	21,656.32
1.B	- Supervision	6,791.11	266.54	7,057.65
1.C	- Education and Information	2,508.63	283.65	2,592.33
1.D	- Control Investigations	-	13.91	13.91
1.E	- Methods Development	-	247.91	247.91
Total, Project I, Jan. 1-June 30, 1949		\$ 57,267.33	\$ 15,776.33	\$ 73,043.66
III	Cooperative Ribes Eradication on State and Private Lands			
3.1	- Clearwater Operation, Idaho	\$ 10,974.84	\$ 3,496.66	\$ 14,471.50
3.2	- St. Joe Operation, Idaho	7,411.53	1,635.54	9,047.10
3.4	- Kaniksu Operation, Idaho	1,682.75	1,028.29	2,711.04
Total, Project III, Jan. 1-June 30, 1949		\$ 20,069.15	\$ 6,160.49	\$ 26,229.64
July 1 to December 31, 1949				
I	1.1 - Clearwater Operation, Idaho	\$ 5,009.85*	\$ 1,130.82	\$ 6,140.67
	1.2 - St. Joe Operation, Idaho	7,718.75*	1,509.84	9,228.59
	1.3 - Coeur d'Alene Operation, Idaho	1,759.48*	404.85	2,164.33
	1.4 - Kaniksu Operation, Idaho	3,520.07*	842.28	4,362.35
	1.6C - Cabinet Operation, Montana	871.05*	255.10	1,126.15
	1.6K - Kootenai Operation, Montana	871.05*	255.11	1,126.16
	1.7 - National Parks	4,978.28	1,217.67	6,195.95
	1.A - Office Maintenance	15,375.92	4,575.37	19,951.29
	1.B - Supervision	6,420.05	524.04	6,944.09
	1.C - Education and Information	2,204.78	286.99	2,491.77
	1.D - Control Investigations	1,052.26*	431.43	1,483.69
	1.E - Methods Development	-	75.94	75.94
Total, Project I, July 1-Dec. 31, 1949		\$ 60,173.54	\$ 11,509.44	\$ 71,682.98
III	3.1 - Clearwater Operation, Idaho	\$ 22,801.06	\$ 5,749.84	\$ 28,550.90
	3.2 - St. Joe Operation, Idaho	30,332.31	5,098.81	35,426.12
	3.4 - Kaniksu Operation, Idaho	2,535.36	6,710.90	9,246.26
Total, Project III, July 1-Dec. 31, 1949		\$ 55,668.73	\$ 17,559.55	\$ 73,228.28
Grand Total, Calendar Year		\$ 183,178.75	\$ 51,000.81	\$ 234,179.56

*Salaries of operation supervisors repaid to our appropriation by the Forest Service not included in these totals, nor are any other items included for which repayment has been made by the Forest Service, National Park Service, or Fruit Fly Investigations.

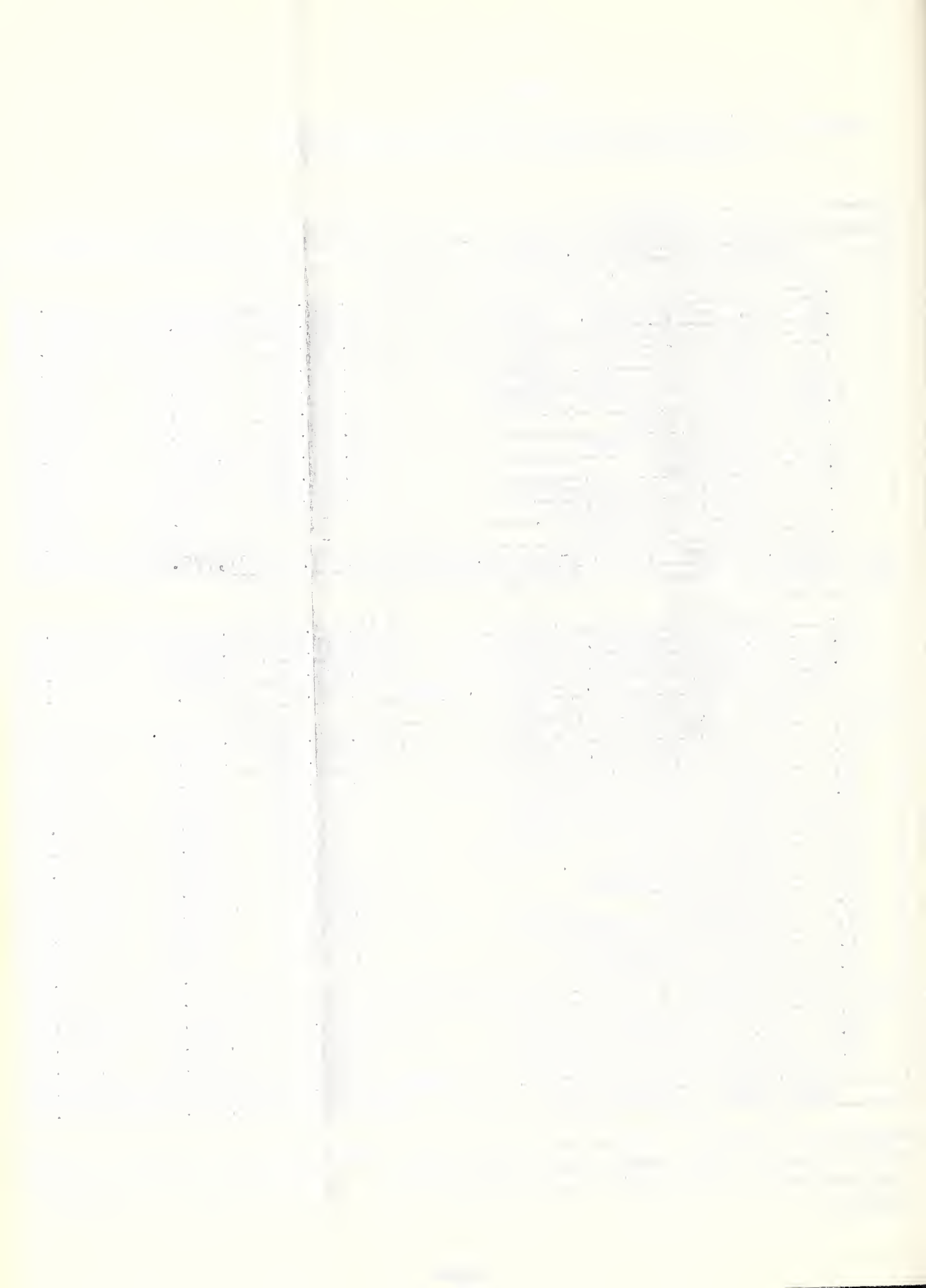


TABLE 2

SUMMARY OF EXPENDITURES FROM STATE AND
PRIVATE FUNDS, 1928 - 1949, IDAHO

Year	State	T.P.A.	Total
1928	\$ 2,518.55	\$ 2,264.32	\$ 4,782.87
1929		19,027.66	19,027.66
1930		20,000.00	20,000.00
1931	5,000.00	35,905.32	40,905.32
1932	8,003.43	11,186.33	19,189.76
1933			
1934	29,154.06		29,154.06
1935	15,000.00		15,000.00
1936	16,998.25		16,998.25
1937	15,001.25		15,001.25
1938	15,000.44		15,000.44
1939	15,438.04		15,438.04
1940	10,034.48		10,034.48
1941	7,542.73	15,756.40	23,299.13
1942	22,761.68	15,440.78	38,202.46
1943	12,252.13	386.68	12,638.81
1944	12,506.60	15,612.98	28,119.58
1945	6,287.68	5,111.03	11,398.71
1946	14,943.35	26,651.65	41,595.00
1947	15,028.11	15,909.24	30,937.35
1948	20,025.00	15,953.94	35,978.94
1949	20,003.03	16,016.58	36,019.61
Total	\$263,499.81	\$215,222.91	\$478,721.72

ANNUAL REPORT
ON
THE CONTROL OF WHITE PINE BLISTER RUST
IN THE
PACIFIC COAST REGION
FOR THE
CALENDAR YEAR 1949

United States Department of Agriculture
Agricultural Research Administration
Bureau of Entomology and Plant Quarantine
Pacific Coast Regional Office
2288 Fulton Street
Berkeley 4, California
February 1950

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PART I

BLISTER RUST CONTROL IN THE PACIFIC COAST REGION

HIGHLIGHTS OF 1949

By

Warren V. Benedict, Regional Leader

Agencies Participating

Agencies participating directly in the control of white pine blister rust in California and Oregon during 1949 were: U. S. Forest Service, National Park Service, U. S. Bureau of Land Management, State of California, the Stockton Box Company, the Michigan-California Lumber Company, and the U. S. Bureau of Entomology and Plant Quarantine. The first three agencies worked on federal lands under their jurisdiction. The last four joined in the cooperative project administered by the Bureau of Entomology and Plant Quarantine for treating lands in state and private ownership. The work of all was coordinated into one uniform program by the Bureau.

The State of California again increased its blister rust control appropriation from \$153,125 in fiscal 1949 to \$168,437 for fiscal 1950. The state also contributed 2,449 man days of labor from two CYA camps, representing an additional contribution of \$53,364. This substantial participation of California, matched by federal funds, is making it possible to uphold a fairly large program on state and private lands. Although not as yet equal in size to the program on federal lands, the cooperative program is nonetheless bringing rust protection to some of the best stands in the state. Moreover, the integration of the work on state and private lands with that on federal is of special significance because of the intermingled pattern of land ownership in the pine forests, plus the fact that by and large the best pine-growing lands are privately owned. The State of California is thus occupying a key position in the rust control program in the state.

Scope of Work

While not greatly below that of 1948 the scope of the work in the region has been decreasing each year since the program's post-war peak of 1945. On the other hand, the accomplishments per man day, expressed in acres treated and ribes destroyed, has increased steadily since war's end as a result of better labor, better supervision and improved methods of destroying ribes. However, this increase in efficiency of operation has not been able to compensate for the decrease in the purchasing power of the lessening federal appropriations. The net result, therefore, is a decrease in acreage treated and reduced over-all control accomplishments.

This slow but continued shrinking in the scope of the work could be viewed with alarm were it not for the fact that, temporarily at least, rust development and spread has been less than expected. This situation is due in large part to weather adverse to full rust development; failure of moisture, temperature, and wind to synchronize with the development and dispersal of the blister rust spores.

At the close of 1949 the rust is either not present or is under effective control in most of the better white pine sites, in which control work is under way or contemplated. This situation, although favorable at present, should not be viewed with complacency. A very formidable program of ribes suppression, both in initial work and in rework, remains to be done. The presence of ribes plants in white pine stands and the propensity of blister rust occasionally to make sudden and far flung advances emphasize the importance of pressing the attack under the present favorable circumstances.

Accomplishments

Control work was done on 125,494 acres; 28,630 acres represented lands not previously treated (initial work), 48,069 acres constituted a reworking of areas where regenerating ribes had developed to the point to require further attention, and on 48,795 acres previously treated an inspection survey disclosed no ribes regeneration had occurred and hence no additional eradivative effort was required.

Results of the year's work are shown in tables 1 through 4. In table 5 is shown an accumulated summary by land ownership of all ribes eradication work done in the region. In a broad sense the data of table 5 present an over-all picture of the status of ribes eradication. Inasmuch as the total acreage of pine type ultimately to be treated represents only an approximation of what may actually be brought under control, the amount of work remaining must be considered in the same light.

Seasonal employment by the five operating agencies was as follows:

<u>Operating Agencies</u>	<u>No. of Laborers</u>	<u>No. of Camps</u>	<u>No. of Contracts Negotiated</u>	<u>Percent of Job Handled by Contract</u>
F.S., R-6	15	1	28	78
F.S., R-5	405	10	40	23
Nat. Park Ser.	408	9	1	2
Bur. Land Mgt.	20	1	11	48
EPQ-Cocp.	<u>262</u>	<u>8</u>	<u>37</u>	<u>19</u>
Totals	1,110	29	117	27

Of the total seasonal camp employment on control work during the year, 72 per cent consisted of college labor, 23 per cent was convict labor employed by R-5 of Forest Service and 5 per cent was delinquent youth labor contributed to the cooperative project by the CYA program of the State of California.

College labor is the best seasonal labor available for control work either for employment by the operating agencies or as a source for developing contractors.

Wages of all free laborers were increased by approximately 10 per cent over the 1948 levels.

Contract Work

Every effort was made in 1949 to expand the contracting procedure as rapidly as competition among bidders could be obtained. Since the camp laborers employed by the government are the only available starting source of ribes eradication experience, prospective contractors largely originate from the camps. Thus, until contracting gains momentum and begins to develop experienced workers within itself, its rate of expansion is limited by the camp program and the type of laborers employed therein.

The extent to which contract work has increased since 1946 when it was first developed is as follows:

<u>Year</u>	<u>Acres Worked by Contract</u>	<u>Acres Worked by Camp</u>	<u>Percentage Contracted</u>	<u>Average Bid Price Per Acre</u>
1946	170	85,794	0.2	\$10.33
1947	6,258	102,179	5.8	6.25
1948	14,698	85,586	14.7	4.86
1949	20,338	56,361	26.5	4.43

The Forest Service in R-6 performed 78 per cent of their ribes eradication work by contract in 1949, and for 1950 the contract program on their lands will reach its maximum expansion. The Bureau of Land Management likewise should expand contract work to the fullest practicable extent within a year or so. Both the Forest Service of Region 5 and the Bureau of Entomology and Plant Quarantine are moving toward a similar goal as rapidly as possible, although it will be several years yet before full use of contracting reaches maximum level because of differing ribes conditions and other operational factors. Contract work will not supplant entirely the crews hired by the government. There will always be some areas which can best be worked by such units. However, ultimately the use of the contract procedure will probably take care of the major part of the ribes eradication job in this region.

An illustration of how the contract price compares with the cost of regular hired laborers is shown below for the Pacific Coast Region during 1949:

<u>Operating Agency</u>	<u>Acres Contracted</u>	<u>Average Bid Price Per Acre</u>	<u>Appraised Price Per Acre</u>	<u>Savings Per Acre</u>	<u>Total Savings</u>
F.S., R-6	7,775	\$3.76	\$7.37	\$3.61	\$26,018
F.S., R-5	5,748	4.90	7.71	2.81	16,152
Nat. Park Ser.	261	1.10	5.60	4.50	1,174
Bur. Land Mgt.	1,688	6.23	8.00	1.77	2,988
EPQ-Coop.	<u>4,866</u>	<u>4.50</u>	<u>8.01</u>	<u>3.51</u>	<u>17,080</u>
Totals or Averages	20,338	\$4.43	\$7.65	\$3.22	\$65,462

The appraisal price per acre was determined prior to advertising the areas for contract work as a means of fixing a maximum rate the government would accept. The rates are based on an evaluation of the factors involved when

the work is done by regular camp laborers, and thus represents an estimate of the cost by force account procedure. Appraisals have averaged plus or minus 5 per cent of the actual cost when done by government crews, and can therefore be considered reliable within such latitude of error. The appraisals are on the conservative side and all expenses not having a direct bearing on doing a job from an established and fully operating camp are not considered. For example, the average per acre cost of ribes eradication by hand work in 1949 was \$16.00. This figure includes the cost of facilitating personnel needed to operate a camp program plus that of supplies and equipment.

When the control program reaches a stage that will permit most of the ribes eradication to be done by contract the government agencies can, to a large extent, dispense with camps. Small administrative camps will be used to care for technicians and inspectors, and in some cases to house small groups of laborers, but the large ribes eradication camps that operate for three or four months each year will no longer be needed. With their passing will follow a sharp reduction in equipment inventory, storage, maintenance, mess operation, and other facilitating jobs essential to a large camp program.

Contract rates are still going downward and should ultimately reach a minimum level established by competition between contractors. Contract work also brings to the blister-rust-control program greater flexibility in accomplishing ribes eradication on small and scattered areas or on intermingled land ownerships than is possible with hired laborers that must be grouped in fairly large camps. As eradication work results in fewer and more scattered ribes, the significance of this greater flexibility will be more pronounced.

Inspection and checking on the adequacy and thoroughness of the ribes suppression job indicates repeatedly that contract work will meet any ribes suppression standard required and will do it faster and at less cost than will government force account crews.

The One-Man System of Ribes Eradication

Developed in 1947 and used extensively by Oregon and California control crews in 1948 and 1949, the so-called "one-man system" of searching for ribes now stands as the important procedure for eradicating ribes by hand from most areas where ribes populations aren't heavy enough for chemical work and where brush cover is not dense. It is described fully in the 1947 annual report.

Actually "one-man system" and "dragline system", the two names in general use, are not too descriptive. More often than not one man does work alone and generally he uses draglines to guide his movements. However, on occasion two and three men work together and sometimes, also, paper squares are used as guide markers, instead of twine. A more correct reference to work by this procedure is to call it the "lot system"; for it is the manner of marking off and covering the ground that most correctly distinguishes the method.

In 1949 about 75 per cent of the area covered by camp crews used the lot system. Paper as a marker in place of draglines was used to a limited extent and shows promise of being the preferred guide marker in areas where ground cover is light. Nylon line has replaced sash and venetian blind cord for dragline. It is lighter and thus can be pulled with less effort. Waxing increases ease of pull and reduces wear.

Modifications in the lot system to cope with local situations were used in 1949. In places two and three men per dragline work better than one man. Increasing the width of the work lane from 2-1/2 to 5 chains is practical for some areas where the light, easily pulled nylon lines are used, although for most situations the 2-1/2 chain strip is preferred. By and large work by the lot system requires better quality supervision than does work by the old three-man crews. Some contractors use the lot system and draglines exclusively, others follow it in some modified form, while some of them do not use it at all. Of special significance is the observation that many contractors use the system when they must clean out ribes to very rigid standards.

Destruction of Ribes by Chemicals

The scope of chemical eradication has varied but little in the four years that 2,4-D has been used as an effective herbicide in killing the two most numerous ribes in the sugar pine types, the Sierra gooseberry Ribes roezli, and the Sierra currant R. nevadense. The 8 truck-mounted power spray outfits are adequate to handle the limited acreage that supports ribes in sufficient numbers for treatment by this method. By keeping them in full operation during the short period each season that spraying can be effectively done, the job for the power spray units will be completed in a few more years without need for equipment replacement. There is, however, a much wider field opening to the application of chemicals by small hand-operated equipment. Through use of such equipment chemical treatment of ribes will supplant hand-grubbing methods over a much wider and diverse range of conditions than is possible with relatively large and inflexible power spray units. Experimental work with 2,4,5-T, another of the hormone-type plant inhibitors indicates this chemical will be effective in killing ribes species that have proved resistant to 2,4-D. Moreover, the use of relatively small quantities of this chemical applied only to crown and basal stems, instead of the over-all spraying of leaves and stems, represents a trend in chemical treatment that, if sustained by wide scale field practice, will mean more progress in accelerating ribes eradication work.

Changes in Control Practice

Blister rust control previous to 1949 was based on the premise that to be effective under conditions prevailing in western mountain areas, ribes must be suppressed to rigid standards applied uniformly over extensive areas. Past work therefore was done mostly on large blocks of pine, often encompassing entire drainages. These large control units generally were, of necessity, composed of good, mediocre, and poor stands of pine and often included varying amounts of non-pine type and non-forested openings.

Experience in the western white pine region of Idaho and in much of Oregon and northwestern California of this region has borne out this early concept, and in the past only a very limited attempt was made to do control work on small blocks of pine. An important exception to this general requirement is indicated by recent studies for a portion of the region, the Sierra Nevada pine belt of California.

Here, blister rust to date has been substantially less active than it has been in other parts of the west during a similar period. This retarded development is attributed to climatic factors--the long, hot, dry summer seasons which characterize the Sierra Nevada and which represent conditions unfavorable for full rust development. Here on the one hand are limited sites where the rust hazard is high and where a very rigid degree of ribes suppression must be maintained to hold the disease in check. Such areas compose from 15 to 20 per cent of the total and normally are the moist sites along streams and meadows. Here also is the other extreme where the rust hazard is so low that little or no ribes eradication work is needed. Areas customarily falling in this classification are the hot south and west slopes at the lower elevations of the pine type. They account for another 15 to 20 per cent of the total. For the bulk of the pine type the rust hazard can be classed as moderate, and if the disease is held under rigid control in the high hazard sites, it appears likely that more ribes can be permitted in these moderate hazard sites than formerly was thought possible.

Two important changes in control practice are suggested by this trend in lessened rust hazard: (1) control measures can be applied to small units of pine, and (2) a less thorough job of suppressing ribes can be tolerated in some sites.

The effect of these two principles when put into practical use is of far reaching influence in the control program. In reality they mean a reorientation of control practice. No longer is it considered essential to reduce ribes populations to uniform levels over large areas. Ribes eradication, in many areas at least, may now be confined to the most productive sugar pine sites and to those stands containing the higher percentages of pine. The significance of this new approach will be seen when one remembers that the occurrence of sugar pine is scattered and uneven, exhibiting large variations within even small areas. If the two premises stated above are correct, and we have reasonable though not conclusive assurance that they are, control work can now be confined to the best pine stands on a purely local basis, and its intensity can be varied with the degree of rust hazard.

The new approach, however, raises problems in its application. If control is to be practiced only where sugar pine grows, the location, size, boundaries, and stocking of the best stands must be known accurately down to small units, possibly as small as 20 acres. This immediately underlines the need for a type of field survey that will yield such data of the accuracy desired. Previous surveys and their methods are inadequate. Fundamentally, the whole concept of a control unit has changed. Then, also, the administration of ribes eradication work is altered and complicated through its application to smaller, discrete areas usually of irregular shape. The matter of adequate protective

zones free of ribes surrounding pine stands under certain conditions must be studied and rules must be worked out. These complicating factors are more than offset, however, by the great savings in the cost of control through (1) the elimination from control work of non-pine areas, (2) the concentration of work in the best pine stands and sites, and (3) the relaxation of standards of ribes suppression in areas of low rust hazard. The control program now possesses a degree of selectivity and versatility not possible under the old concept of large unbroken control areas. The possibilities of the new orientation are not yet fully explored or even fully understood, but their adoption will bring forth further improvements and economies as new facts, new experience, and a new understanding are gained.

This reshaping of the control job, which was started in 1949, should reduce by a substantial amount the size of the blister rust control job in the region. How much this reduction will be cannot be estimated accurately, for it is yet too soon to assess fully the influence of the more liberal ribes standards on control progress or on what final acreage ribes eradication will be applied.

White Pine Appraisals

As blister-rust-control measures are applied to smaller and smaller pine stands and pine-growing sites, it becomes increasingly important to know where the stands are, to know their size and shape, and to know as accurately as possible the white pine stocking within them. The pattern of white pine distribution and the degree of stocking determine where control work will be done. To gather information on these points existing control areas are being reexamined, and other pine growing lands are being scrutinized for possible establishment as control areas. All this implies standards of stocking by site and type that will answer the question: how much pine must there be to justify protection in the various forest conditions?

Answers to these questions demand a different approach to the problem than that employed in the standard reconnaissance procedures in use prior to 1949. Studies made over the past two years, in collaboration with the California Forest and Range Experiment Station and the Region 5 office of the Forest Service, resulted in the adoption of a method of sampling pine areas that present the essential information on pine distribution. Briefly, the numbers of dominant and codominant trees are recorded by five size classes on a series of two-chain transects forming a continuous strip one-half chain wide. Strips are spaced as close together as required to present an accurate picture of pine distribution.

During 1949 a total of 64,816 acres was systematically surveyed with 451 man days of labor on the Shasta, Lassen, Plumas, Eldorado, Stanislaus, and Sierra Forests.

Sugar Pine Management Studies

Experimental logging of old growth mixed conifer forests on the Dodge Ridge tract of the Stanislaus Forest by Forest Service, under the technical direction of Duncan Dunning of the California Forest and Range Experiment Station, is progressing according to schedule. The area logged in 1948 was

relogged in 1949 to remove the sugar pine seed trees left for one year to seed the area. Establishment of sugar pine seedlings was good, although falling short of the numbers desired because of the depredations of rodents, apparently mice, during the winter. This emphasizes again the importance and difficulty of maintaining effective control of rodents on logged areas.

Economic Study of Growing Sugar Pine

Henry J. Vaux, Lecturer in Forestry at the University of California, continued this study during 1949 but has not as yet had an opportunity to analyze his data or to prepare a report. Members of our staff assisted Vaux in some aspects of this study, particularly relating forest stand densities and types to ribes suppression work.

Spread of the Rust

From the northern end of the Lassen Forest northward the rust spread freely from pine to ribes during the spring of 1949. However, conditions for rust intensification on ribes were not favorable during the summer and very little rust build up was noted until fall rains occurred about September 1. By that time many of the leaves initially infected had fallen, thereby reducing the rust on ribes to a relatively small amount.

Rusted ribes south of the Lassen Forest were few and those infected were confined to the immediate vicinity of sporulating cankers. The only exception found during the entire season occurred when one infected leaf was located on the southern end of the Mendocino National Forest. This was the first time blister rust on either host had been found on that forest and was the first discovery in Colusa County. Rust had previously been found along the coast farther west so this new location does not extend the southward range of infection. Cankers located on sugar pine growing along Park Creek on the southern end of the Eldorado National Forest extended the known southward spread of blister rust on pine in the Sierras about 11 miles.

Numerous cankers of 1946 and 1947 origin and a few of 1948 origin were found on South Fork Mountain on the Trinity National Forest. This indicates the rust is building up quite rapidly at the favorable spots on this forest. A similar situation is developing on parts of the Shasta National Forest.

There was no indication of a long distance spread of infection this year.

There is no rust damage of significance within pine areas where control work has been done. In areas not outlined for control, the rust is well entrenched, is developing progressively and in some sites has already caused severe and heavy damage to immature pine.

Informational Activities

Informational activities in the Pacific Coast Region were as follows:

Motion Pictures - The use of films constitutes the most popular form of acquainting the public with the blister rust work, especially where the audience is small. During 1949 we showed our films 110 times before a total of approximately 7,730 persons. The type of audience included business men's commercial clubs; forestry clubs; conservation societies; botany, forestry, and pathology classes in high schools and colleges; and tourist gatherings at National Park campgrounds and visitors at county fairs. These showings always brought many questions from the audience and revealed an interest in the project.

Exhibits - Exhibits were shown at three county fairs. They were built from materials gathered on the forest and depicted a mountain scene, using living trees and ribes bushes to illustrate the life cycle of the rust and resulting damage. About 80,000 persons viewed them.

Radio Broadcasts - Thirteen broadcasts of about 7 minutes each were made. Coverage was state wide in California. Previously approved material describing the action of the rust and its threat to California's sugar pines constituted the main theme. Station managers showed a gratifying willingness to donate time for conservation material such as ours.

Publications - Three publications were used: color Picture Sheet No. 22, the Bureau's folded leaflet of questions and answers on blister rust, and a larger multilithed regional brochure. Literature was given out at all fairs, at motion picture showings, and was mailed in answer to inquiries. About 3,000 pieces were distributed.

Newspaper Stories - In nearly all cases this type of informational release consisted of stories in the newspapers regarding local workers and to matters relating to employment.

TABLE 1
SUMMARY OF RIBES ERADICATION BY OPERATING AGENCY

Operating Agency	Acres Protected			Ribes Destroyed	Man Days Expended			Per Worked Acre	
	Worked Area		Inspected and Requiring No Work		Eradicating Ribes	Inspecting Area	Total		
	Initial Erad.	Reerad.							
U.S. Forest Service, R-6	664	9,253	3,220	13,137	258,305	542	3,634	26	0.31
U.S. Forest Service, R-5	13,686	11,023	6,848	31,557	3,856,062	825	21,388	156	0.83
National Park Service	3,920	8,999	2,355	15,274	2,505,604	699	15,068	194	1.11
Bureau of Land Management	1,195	2,354	18,885	22,434	33,402	252	1,770	9	0.43
EPQ-Coop.	9,165	16,440	17,487	43,092	2,315,759	1,196	12,852	90	0.46
Totals	28,630	48,069	48,795	125,494	8,969,132	3,514	54,712	117	0.67

TABLE 2

SUMMARY OF RIBES ERADICATION BY TYPE OF WORK

Type of Work	Acres Protected	Ribes Destroyed	Man Days Expended	Per Acre	
				Ribes	Man Days
Inspected and requiring no work	48,795	-	3,514	-	0.07
Hand eradication by camps	55,303	6,203,171	42,237	112	0.76
Chemical eradication by camps	1,058	1,838,059	1,940	1,737	1.83
Contract work*	20,338	927,902	7,021	46	0.35
Totals	125,494	8,969,132	54,712	71	0.44

*The average contract bid price was \$4.43 per acre.

TABLE 3

SUMMARY OF EXPENDITURES

Operating Agency	Expenditures	Costs		
		Per Worked Acre	Per Acre Protected	Per Man Day
Forest Service, R-6	\$ 82,449	\$ 8.31	\$ 6.28	\$ 22.70
Forest Service, R-5	400,195	16.20	12.68	18.71
National Park Service	291,044	22.53	19.05	19.32
Bureau of Land Management	85,856	24.19	3.83	48.51
EPQ-Coop.	298,607	11.66	6.93	23.23
Totals	\$ 1,158,151	\$ 15.10	\$ 9.23	\$ 21.17

TABLE 4

SUMMARY OF ACREAGE PROTECTED BY LAND OWNERSHIP

Operating Agency	Total Acres	Ownership of Acres Protected			
		National Forest	National Park	Bureau of Land Management	State and Private
Forest Service, R-6	13,137	12,895	-	-	242
Forest Service, R-5	31,557	24,135	-	-	7,422
National Park Service	15,274	-	15,274	-	-
Bureau of Land Management	22,434	9,851	-	11,626	957
EPQ-Coop.	43,092	4,837	-	-	38,255
Totals	125,494	51,718	15,274	11,626	46,876

TABLE 5

SUMMARY OF STATUS OF RIBES ERADICATION BY LAND OWNERSHIP

Land Ownership	Acres in Control Area	First Working		Second Working Acres	Other Workings Acres	On Maintenance		Remaining Work	
		Acres	Per Cent			Acres	Per Cent	Unworked Acres	Requiring Rework Acres
California: National Forest	642,000	344,000	54	176,000	107,000	55,000	8	238,000	289,000
National Park	231,000	108,000	47	50,000	13,000	25,000	11	123,000	83,000
State and Private	629,000	359,000	57	157,000	90,000	44,000	7	270,000	315,000
Oregon: National Forest	144,000	92,000	64	45,000	23,000	25,000	17	52,000	67,000
National Park	4,000	3,800	96	350	400	3,500	89	200	300
Bureau of Land Management	83,000	41,000	50	15,000	-	21,000	26	42,000	20,000
State and Private	53,000	46,000	87	10,000	2,000	25,000	47	7,000	21,000
Totals	1,786,000	993,800	56	453,350	235,400	198,500	11	792,200	795,300

PART II

LEADERSHIP, COORDINATION, AND TECHNICAL DIRECTION OF BLISTER RUST CONTROL BY THE BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

Financial Project BLR-1-5

By

Alden J. Thompson, Agent

PURPOSE

During 1949, as in the past, several Federal agencies performed work programs to control white pine blister rust on lands of their respective jurisdiction. California and a few private lumber companies in the state contributed financial aid and facilitating services. Oregon made contributions of facilities and services. Under the Lea Act of 1940, Congress delegated to the Bureau of Entomology and Plant Quarantine the responsibility of leadership, coordination, and technical direction of blister-rust-control work programs. The Bureau is also responsible for the collection, summarization, and presentation of basic field data.

ORGANIZATION

Through its technical staff the Bureau carried out the purposes of this project from its regional headquarters in Berkeley, California. During the winter and spring staff members of the various cooperating agencies were in consultation with the Bureau's staff to plan the season's work programs. Throughout the season Bureau staff members were present on all active operations to give technical advice and any assistance necessary to coordinate the blister-rust-control program of the cooperating agency. Pathologic and ecologic data concerning white pine blister rust were collected by staff members of the Bureau and distributed to the various cooperators.

Prior to the 1949 field season representatives of the Bureau and of participating Federal agencies agreed to accept higher wage rates for unclassified personnel. These rates were established through a survey of the Forest Service wage board. Late in the season the classified grades and rates were also changed by "The Classification Act of 1949" and were effective October 30, 1949. The new rates for classified and unclassified personnel are shown in the following table.

Rates of Pay for Seasonal Employees

Classified

<u>Field Operating Title</u>	<u>Grade</u>		<u>Per Annum Rate</u>		<u>Hourly Rate</u>	
	<u>Before</u>	<u>After</u>	<u>Before</u>	<u>After</u>	<u>Before</u>	<u>After</u>
	<u>Oct.30</u>	<u>Oct.30</u>	<u>Oct.30</u>	<u>Oct.30</u>	<u>Oct.30</u>	<u>Oct.30</u>
Field Supervisor: Camp Superintendent- Eradication Chief of Party- Reconnaissance	SP-7	GS-6	\$3351.00	\$3450	\$1.61	\$1.66
Field Supervisor: Foreman-Eradication Scout-Reconnaissance	SP-6	GS-5	2974.80	3100	1.43	1.49
Field Supervisor: Assistant Foreman- Eradication Assistant Scout- Reconnaissance Assistant to Operation Supervisor	SP-5	GS-4	2724.00	2875	1.30	1.38
Inspector: Checker-Foreman	SP-7	GS-6	3351.00	3450	1.61	1.66
Inspector: Senior Checker	SP-6	GS-5	2974.80	3100	1.43	1.49
Inspector: Junior Checker	SP-5	GS-4	2724.00	2875	1.30	1.38

Unclassified

<u>Field Operating Title</u>	<u>Per Annum Rate</u>	<u>Hourly Rate</u>
Cooks, Unallocated:		
First (over 35 men)	\$3250.68	\$1.56
First (11-35 men)	3100.20	1.49
First (6-10 men) and also a second cook	2799.24	1.34
Second	2799.24	1.34
Under 5 men	2519.40	1.21
Flunky	2284.00	1.098
Laborer: Crewleader Camp Assistant-Clerk	2573.52	1.23
Crewman	2350.00	1.13
Truck Driver, Mt. Lt., 1½ ton	2694.96	1.29

ACCOMPLISHMENTS IN LEADERSHIP AND COORDINATION

The Bureau provided the necessary technical direction to coordinate the white pine blister rust programs of the following participating agencies:

1. Federal agencies engaging in control programs:
 - a. Bureau of Entomology and Plant Quarantine
 - b. U. S. Forest Service
 - c. National Park Service
 - d. Bureau of Land Management
2. State and private agencies that contributed financial aid in the cooperative control program:
 - a. State of California (Division of Forestry, Department of Natural Resources). Yearly appropriations have been made since 1941. The appropriation for the fiscal year July 1, 1949 to June 30, 1950 is \$168,437; that for the previous fiscal year was \$153,125.
 - b. The Michigan-California Lumber Company has made a yearly contribution of \$2,000 since 1942.
 - c. The Stockton Box Company entered the project for the first time with a contribution of \$2,000.
3. Agencies contributing services and facilities under Memoranda of Agreement with the Bureau of Entomology and Plant Quarantine:

<u>Agency</u>	<u>Value of Contributed Facilities and Services</u>
a. State of California	
(1) Department of Natural Resources, Division of Forestry	Services of two CYA camps valued at \$53,364.
(2) Department of Agriculture	\$4,000
(3) College of Agriculture University of California	\$2,000
(4) Botanical Gardens University of California	\$ 200
b. State of Oregon	
(1) Oregon State Board of Forestry	\$ 500
(2) Department of Agriculture Bureau of Plant Industry	\$ 500

The Memoranda of Agreement between the Bureau, the Federal Agencies, States, and private lumber companies were continued through 1949. An agreement with the Stockton Box Company of California was effected for the first time in 1949.

An important function of the Bureau was the recruitment of labor for the project. The Regional Office undertook this task of recruiting laborers and supervisory personnel for the Bureau camps, and to a limited extent for camps of the National Park Service and the U. S. Forest Service. A total of approximately 685 laborers were selected and assigned to the field operations. Recruiting was again carried out on a nation wide scale through correspondence with colleges and universities. In spite of efforts to keep the number of applications relatively small by thorough screening at the source, about 4,000 were filed. Except for the very early season requirements for camp construction and spray crews, the majority of men hired were from colleges and universities. This type of labor is still regarded as the best for the blister-rust-control operations. Preference in employment was given veterans, former employees, and to men over 20 years of age.

Some problems in recruiting still to be solved are:

1. Securing competent men for the early season work. Few college men become available before the middle of June.
2. Securing adequate technical and supervisory personnel during the early part of the season to open camps and train inexperienced personnel.
3. Difficult to select men that will stay the full season and not leave before school begins.

Sugar Pine Management Studies

A report of this project is in Part I, page 7 (Highlights of 1949).

The preliminary report, "Some Economic Aspects of Growing Sugar Pine in California", by Henry J. Vaux, Lecturer in the School of Forestry of the University of California, is also covered in Part I.

ACCOMPLISHMENTS IN TECHNICAL DIRECTION

A Bureau staff member was assigned to each active operation and was responsible for all technical decisions pertaining to blister-rust-control work programs.

Local Control

This subject is covered in Part I under "Changes in Control Practices", pages 5 to 7.

Control Standards

An accomplishment in technical direction which began in 1948 is the development of new control standards designed to assure protection to selected sugar pine stands at less cost. For two decades prior to 1948 there was relatively little change in blister-rust-control standards. These standards were designed upon the assumption that hazard from blister rust infection was uniform over large areas, regardless of localized conditions. During the latter part of this period studies of rust behavior indicated that this assumption was not true. The realization that the rust problem differed widely with habitat, and that the application of control standards should recognize localized ecologic, pathologic, and climatic conditions pointed toward a revision of the standards.

A set of tentative standards was written in the spring of 1948. These new standards were based on ribes ecology. They standardized the collection and use of seedling and fruiting bush data, and added ribes age as an item of data to be collected under certain conditions. Two ultimate or maintenance standards, based on a very general concept of timber type were set up, and two working standards, with which to approach the maintenance standards were added. One of the working standards introduced the strict control of fruiting in the ribes suppression practices. The differences among the new 1948 standards were much greater than in the old standards. Field sampling methods remained much the same, but collection of added information on some areas was presumed to make the cost of checking slightly more expensive.

After a season's trial the standards were discussed at a field meeting of the Bureau's technical staff in the fall of 1948. With additional information a revised set of standards was written in the spring of 1949. This time the emphasis was placed on the pathology of the rust, but inasmuch as the pathologic determinants of the standards parallel the ecologic ones, no great over-all differences in the 1949 standards took place. This second set of standards is comprised of three maintenance standards and two working standards. The requirements of the maintenance standards are based upon that degree of ribes scarcity estimated to be necessary to prevent intolerable losses of pine on the specific rust hazard area considered. (The different rust hazard areas are presented in Part I under "Changes in Control Practice".)

The 1949 standards are not necessarily final. Some refinements of field application must be smoothed out, and some other minor changes now appear desirable. As forest management becomes more intensive and as ribes control becomes increasingly more precise, further changes in control standards may be desirable.

Changes in Summary Tables

A few changes in Tables I and II (Summary of Ribes Eradication) of each section of the 1949 annual report have been made. Previously all blocked-out areas on reeradication were shown in a column headed "Acres Ribes Free at Reeradication." This acreage was not claimed in the totals as having been treated. It has been decided, beginning with the 1949 work, that all the acreage shown under "Acres Ribes Free at Reeradication" should be

accounted for in the same manner as that requiring no work (block out) on initial eradication. The heading on the "block out" column has been changed to "Checked and Meeting Control Standards Without Work", and all acres that have a current check on them and not needing work will be shown in this column. The reason for the change is that checking man days and money were expended to determine this condition. Since the pine is receiving protection, even though no eradication man days were expended, this acreage should be included in the total acres covered at the time of eradication. Another change that follows right in with the above is the addition of checking man days to the eradication man day totals of the same tables. In Table I the man day column has been divided into three columns; checking man days, eradication man days, and total man days. This breakdown is to show how many checking man days actually went into the protection job. In Table II the checking man days are included with the eradication man days under "Total 8-Hour Man Days". Since checking man days are effective man days in getting the final protection job done it was decided that they should be included in the totals.

One-Man System of Ribes Eradication

The one-man system of ribes eradication has become one of the prime means of working areas in the blister rust control program. In Oregon it was used in all the Federal agency camps. In California it was used in all Bureau camps, and in nearly all the other Federal agency camps. A few Park Service and Forest Service camps were still using the old three-man crew system because some of the operations didn't have the necessary trained supervisory personnel that the one-man system needs in order to operate at the optimum of success. The three-man crews were still being used in areas of heavy brush and on stream type work. But over all, the one-man crew still proves to be more economical and assures a better quality of work.

A few comments are listed below:

1. As an area approaches maintenance the one-man system may not be as economical as other systems, such as scouting by a foreman or checker-flanker system of coverage.
2. Small irregular shaped parcels and long narrow strips along streams can be worked more advantageously by other systems.
3. The lot system of plotting ribes density gives a better picture of areas of light and heavy ribes concentrations.

Contract Ribes Eradication

During the field season of 1949 the Bureau and other cooperating Federal agencies engaged in an expanding program of contract ribes eradication in the Pacific Coast Region. The contract program has increased from about 15 per cent of the total area worked in 1948 to 26 per cent in 1949.

See page 3 of the "Highlights" section for the trend in the expansion of contract work.

Ribes eradication on more and more small areas, especially outlying blocks of a unit, are being contracted. Some operations would like to do all work under contract as soon as contractors become available. The lack of experienced contractors will tend to keep the eradication program from going entirely to contracting until enough experienced men become interested in this type of work.

Some contractors are calling for regular checks before an area is actually ready for a check and consequently are having to rework these areas several times. In order to put a stop to this practice and reduce the cost of checking, a charge of 25¢ per acre will be made for any check over the second regular check. By this means it is expected to keep contractors from calling for checks in rapid succession with the hope of getting an area to check out with very little work expended.

Chemical Ribes Eradication

The use of power spray equipment for the application of 2,4-D sprays was continued during 1949. Accomplishments of the power spray project for 1949 are summarized in the regional summary tables. A total of eleven power spray units were used; four truck-mounted units and two semi-portable units by the Forest Service, one truck-mounted, one semi-portable, and one skid-mounted unit by the National Park Service, and two truck-mounted units by the Bureau. For areas inaccessible to the power spray units, or too small to justify the use of this type of equipment, the knapsack applicator was used. To standardize and coordinate methods and practices in the application of 2,4-D sprays the Bureau provided a staff technician to visit each operation and give detailed on-the-job training to all spray crews.

Presumably the movement of 2,4-D is associated with the translocation of the products of photosynthesis. Hence the movement from leaves low in carbohydrates at the time of application is far less than from leaves high in carbohydrates, and there is likewise less movement of the 2,4-D stimulus from leaves grown under reduced light where photosynthesis is at a low level. Previous experience has indicated that the per cent of kill with 2,4-D ribicide decreases rapidly with increased age of bushes, as well as with the ending of the growing season. Field applications of 2,4-D sprays began on June 1 and terminated on all operations on July 22, 1949.

A number of proprietary 2,4-D compounds were used during the 1949 season. Dilutions were made to give 500 parts per million acid equivalent in water for the final spray solution. Titanox B-30 (containing 30 per cent titanium dioxide and 70 per cent barium sulfate) was used as a marking agent. Wetting agents were not used as the commercial proprietary compounds of 2,4-D included a wetting agent in the formula.

Decapitation and treatment with 2,4-D of the cut stubs was standard practice on all operations for the eradication of troublesome rock-bound or log-covered ribes. For this treatment liquid concentrates of 2,4-D esters in oil, 5 per cent solution, were used. Dosage, sufficient to wet all cut surfaces, was made by either oil can or pressure type hand applicators.

Checking

By agreement with the several Federal agencies the Bureau handled all checking activities on a reimbursable basis. In the Pacific Coast Region 88 checkers were employed this season; 69 in California and 19 in Oregon. In nearly all cases college students and men with previous experience filled the positions. The quality and efficiency of the personnel continued to show marked improvement since the war years.

About half the checkers' time was spent on post checking. Large areas in the control units are nearing maintenance due to previous eradications, which requires a large post checking program be undertaken in order to delimit enough work for the present season and future work programs. The checker-flanker system of post checking was used to a great extent. Under this system two experienced eradicators flanked the checker searching out ribes sites and digging all ribes that were found. Through this system of checking a large area nearing maintenance was eliminated from further work. The remainder of the checkers' time was pretty evenly divided between regular and advance checking. As the contract program increases a larger percentage of the checkers' time will be confined to regular checking. All contracts need a regular check before payment can be made on completed work, whereas some of the camp work finished just before camp closes does not get a regular check. A summary of the season's checking appears in the regional summary tables.

Scouting and Disease Survey

There was a general spread of white pine blister rust from pines to ribes during the spring of 1949 north of the Pitt River. A somewhat lighter spread occurred on the ribes growing in the area lying south of the Pitt River and north of Mill Creek on the Lassen National Forest. Apparently conditions necessary for the intensification of the rust on ribes were never very favorable throughout the summer, as there was little build up of the rust on ribes leaves. There was practically no precipitation from late May to mid-September which was probably responsible for lack of rust intensification. Blister rust on ribes appeared to be less prevalent in late August and early September than it was in late June, which indicates that many of the infected leaves dropped during the summer. It was noted that about one-half of the rust found before September 15 was still in the uredial stage. This may also have been a result of the extremely dry summer.

The area south of Mill Creek apparently received few aeciospores or conditions were unfavorable for aeciospore germination as there were few or no rusted bushes at the more favorable rust sites. This condition held true from Mill Creek on the Lassen National Forest to the southern boundary of the infection zone on the Eldorado National Forest. The lack of blister rust on ribes, except in the immediate vicinity of sporulating cankers, is almost conclusive proof that no long-distance spread of the rust occurred from the aeciospores produced in the north to the ribes growing in the sugar pine belt of the northern Sierra Nevada mountains.

Several new infection centers on pine were discovered but all of these were within a few miles of areas where cankers previously had been found.

One center on Park Creek in the central part of the Eldorado National Forest extended the known limit of infected pines about 12 miles farther south. Two trees with three 1944 origin cankers were found at this site. One of the most spectacular infection centers yet found on sugar pine is on the northern end of Lassen National Forest located along a draw on the west side of Sanders Ridge. The growing site along the draw is excellent for sugar pine. The mature timber was logged many years ago and only a stringer of pine came back along the small stream with the rest of the area covered by brush. These young sugar pines are now from a few feet to about 30 feet tall and some of the trees have leaders 2 feet or more in length. The rust spread year of 1938 caused a few cankers but numerous cankers originated during 1941. Trees that are now 30 feet high were only 12 to 15 feet tall in 1941 and many of the cankers that originated on the limbs are now well developed trunk cankers. Many of the larger limbs have completely flagged emphasizing the damage done to fast growing trees by the rust.

Scouting performed by members of the scouting crew assigned to cover the southwest portion of the Shasta National Forest and all of the Lassen National Forest revealed numerous localized pine infection centers heretofore unknown. This coverage shows the rust to be building up quite rapidly on sugar pine growing on the more favorable sites between the Pitt and McCloud Rivers west of highway 89.

Scouting on the west side of the Trinity National Forest also revealed numerous cankers of 1946 and 1947 origin with a few 1948 cankers already showing up on 1948 wood. The pine growing on those sites highly favorable for rust development on the latter forest have become heavily infected during the last three years. Trees less than 8 feet tall supporting 50 to 100 cankers were not uncommon. Generally these spots are small, being confined to a few acres, but infection centers on South Fork Mountain and along Grizzly Camp Road are becoming more numerous.

One infected leaf of Ribes inerme found on the southern end of the Mendocino National Forest was identified as blister rust. Although this was the first time rust had been found on either host on this forest it had been found on ribes growing near the coast to the west. This find placed the rust in Colusa County for the first time.

Five one-acre disease survey plots of a permanent nature were established to determine the effectiveness of the control program as now being applied. One plot each were situated on the Klamath, Rogue River, and Eldorado National Forests, and two were located on the Lassen National Forest. These plots were established within control units and were placed inside pine infection centers.

Although rust sample determinations were not always positive as to which species of Cronartium was present on the ribes leaves, indications are that there was a heavy spread of pinyon rust from the northern end of the Lassen National Forest to the north and west. To illustrate how scarce ribes infection was south of the Lassen only about 30 rusted ribes were found on the Plumas, Tahoe, Eldorado, Stanislaus, and Sierra National

Forests and in Yosemite National Park. No infected leaves were found on either the Sequoia National Forest or Sequoia National Park although ribes were examined at numerous places on both.

White Pine Appraisals

This subject is covered in Part I, page 7.

TABLE 1

FISCAL YEAR ALLOTMENTS FROM WHICH EXPENDITURES WERE MADE IN THE
PACIFIC COAST REGION DURING THE CALENDAR YEAR 1949

Federal Funds		
<u>Agency</u>	<u>Fiscal Year 1949</u>	<u>Fiscal Year 1950</u>
Bureau of Entomology and Plant Quarantine	\$ 251,899	\$ 237,649
Forest Service Region 5 (California)	500,000	500,000
Forest Service Region 6 (Oregon)	108,779	60,300
National Park Service:		
Yosemite National Park	165,950	162,500
Sequoia-Kings Canyon National Parks	99,350	92,000
Lassen Volcanic National Park	1,000	5,700
Crater Lake National Park	-	2,100
Regional Office	25,000	25,000
Bureau of Land Management	<u>93,000</u>	<u>96,100</u>
Total Federal Funds	\$1,244,978	\$1,181,349*
Cooperative Funds		
State of California	\$ 153,125	\$ 168,437
Diamond Match Company	2,000	-
Michigan-California Lumber Company	2,000	2,000
Stockton Box Company	-	2,000
Winton Lumber Company	<u>1,000</u>	<u>-</u>
Total Cooperative Funds	\$ 158,125	\$ 172,437
Total All Funds	\$1,403,103	\$1,353,786

*Figures in this column represent allotments as they are known as of December 31, 1949 and are subject to change until June 30, 1950.

TABLE 2

EXPENDITURES IN THE PACIFIC COAST REGION FOR THE CALENDAR YEAR 1949

	Federal Funds			Oregon			Region Total
	California		Fiscal Year 1949 1/1/49-6/30/49	Fiscal Year 1950 7/1/49-12/31/49			
	Fiscal Year 1949 1/1/49-6/30/49	Fiscal Year 1950 7/1/49-12/31/49		Fiscal Year 1949 1/1/49-6/30/49	Fiscal Year 1950 7/1/49-12/31/49		
Bureau of Entomology and Plant Quarantine	\$101,731	\$123,215	:	\$ 5,408	\$ 6,889	:	\$ 237,243*
Forest Service Region 5	126,043	274,152	:	-	-	:	400,195
Forest Service Region 6	-	-	:	37,760	44,689	:	82,449
National Park Service:			:			:	
Yosemite National Park	23,097	139,847	:	-	-	:	162,944
Sequoia-Kings Canyon National Parks	18,110	80,794	:	-	-	:	98,904
Lassen Volcanic National Park	886	2,729	:	-	-	:	3,615
Crater Lake National Park	-	-	:	-	378	:	378
Regional Office	14,029	11,174	:	-	-	:	25,203
Bureau of Land Management	-	-	:	34,562	50,894	:	85,856
Total Federal Funds	\$283,896	\$631,911	:	\$78,130	\$102,850	:	\$1,096,787
Cooperative Funds							
State of California	\$ 35,400	\$119,482	:	-	-	:	\$ 154,882
Michigan-California Lumber Company	-	2,000	:	-	-	:	2,000
Stockton Box Company	-	2,000	:	-	-	:	2,000
Total Cooperative Funds	\$ 35,400	\$123,482	:	-	-	:	\$ 158,882*
Total All Funds	\$319,296	\$755,393	:	\$78,130	\$102,850	:	\$1,255,669

*In addition to these amounts expended from Bureau and Cooperative funds, \$68,720 was expended for which reimbursement was claimed.

TABLE 3

STATEMENT OF ALLOTMENTS BY FISCAL YEARS FOR RIBES ERADICATION
ON STATE AND PRIVATE LANDS

Fiscal Years	State of California Contributions			Private Cash Contributions	Total State and Private	B.E.P.Q. Allotments				Total State, Private and Bureau
	Cash	Other*	Total			3101.14 3103.14 73.14			Total B.E.P.Q.	
						W-a.14	and W-e.14			
1942	\$ 25,000	-	\$ 25,000	-	\$ 25,000	\$ 61,370	\$ 14,625	\$	75,995	\$ 100,995
1943	25,000	-	25,000	\$ 6,000	31,000	71,000	71,770		142,770	173,770
1944	50,000	-	50,000	6,000	56,000	82,825	86,195		169,020	225,020
1945	50,000	-	50,000	4,000	54,000	83,216	85,040		168,256	222,256
1946	75,000	20,410	95,410	5,000	100,410	95,250	271,125		366,375	466,785
1947	75,000	74,860	149,860	5,000	154,860	137,022	563,000		700,022	854,882
1948	125,000	48,142	173,142	5,000	178,142	126,000	130,000		256,000	434,142
1949	153,125	43,044	196,169	5,000	201,169	136,459	115,440		251,899	453,068
1950	168,437	40,598	209,035	4,000	213,035	132,649	105,000		237,649	450,684
Totals	746,562	227,054	973,616	40,000	1,013,616	925,791	1,442,195		2,367,986	3,381,602
Accumulative Expenditures 7/1/41 to 12/31/49	\$ 679,831	\$ 227,054	\$ 906,885	\$ 40,000	\$ 946,885	\$ 865,795	\$ 1,395,947		\$ 2,261,742	\$ 3,208,627

*Cost per acre of Bureau work applied to acreage worked by California Youth Authority.

REGIONAL SUMMARY TABLES

TABLE 1
THE STATUS OF RIBES ERADICATION IN THE PACIFIC COAST REGION AS OF DECEMBER 31, 1949

PART A - CALIFORNIA

Control Operation	Class of Ownership	Control Units		Status of Ribes Eradication					
		Total Acres	Acres Unworked	Net Acres First Working	Net Acres Second Working	Net Acres Other Workings	Total All Workings		
							Net Acres	Man Days	Ribes Eradicated
National Forests									
Mendocino	Federal	8,720	8,720						
	Private	4,080	4,080						
	Totals	12,800	12,800						
Trinity	Federal	51,380	51,380						
	Private	17,020	17,020						
	State	320	320						
	Totals	68,720	68,720						
Klamath	Federal	13,341	1,065	12,276	6,402	1,349	20,027	19,087	1,331,980
	Private	18,182	2,138	16,044	6,433	1,700	24,177	23,133	1,619,456
	State	80		80	40		120	45	2,681
	Totals	31,603	3,203	28,400	12,875	3,049	44,324	42,265	2,954,117
Shasta	Federal	3,440	3,440						
	Private	25,400	25,400						
	Totals	28,840	28,840						
Lassen	Federal	42,040	23,118	18,922	7,129	2,497	28,548	16,049	2,806,253
	Private	211,093	122,792	88,301	27,428	24,943	140,672	77,249	10,421,342
	State	582	495	87	40	20	147	102	19,653
	Totals	253,715	146,405	107,310	34,597	27,460	169,367	93,400	13,247,248
Plumas	Federal	139,359	49,037	90,322	44,439	23,540	158,301	102,569	17,126,466
	Private	72,616	21,796	50,820	22,073	15,664	88,557	66,246	10,143,784
	State	360	285	75	40		115	96	21,740
	Totals	212,335	71,118	141,217	66,552	39,204	246,973	168,911	27,291,990
Tahoe	Federal	24,960	24,960						
	Private	2,520	2,520						
	Totals	27,480	27,480						
Eldorado	Federal	107,054	32,193	74,861	34,483	9,223	118,567	74,590	14,225,812
	Private	110,136	18,605	91,531	48,343	18,226	158,100	96,843	18,454,527
	State	2,292		2,292	1,165	1,141	4,598	2,375	420,156
	Totals	219,482	50,798	168,684	83,991	28,590	281,265	173,808	33,100,495
Stanislaus	Federal	104,370	10,709	93,661	57,223	44,320	195,204	96,711	22,411,509
	Private	95,431	6,140	89,291	43,647	22,612	155,550	76,787	17,852,535
	Totals	199,801	16,849	182,952	100,870	66,932	350,754	173,498	40,264,044
Sierra	Federal	132,431	78,456	53,975	26,603	25,820	106,398	137,854	32,560,412
	Private	43,602	27,426	16,176	6,830	5,747	28,753	32,417	7,055,211
	Totals	176,033	105,882	70,151	33,433	31,567	135,151	170,271	39,615,623
Sequoia	Federal	14,450	14,450						
	Private	17,150	17,150						
	State	3,400	3,400						
	Totals	35,000	35,000						
TOTAL ALL NATIONAL FORESTS	Federal	641,545	297,528	344,017	176,279	106,749	627,045	446,860	90,462,432
	Private	617,230	265,067	352,163	154,754	88,892	595,809	372,675	65,546,855
	State	7,034	4,500	2,534	1,285	1,161	4,980	2,618	464,230
	Totals	1,265,809	567,095	698,714	332,318	196,802	1,227,834	822,153	156,473,517
National Parks									
Lassen Volcanic	Federal	17,425		17,425	3,040	187	20,652	7,398	884,551
	Private	140		140	15		155	61	15,715
	Totals	17,565		17,565	3,055	187	20,807	7,459	900,266
Yosemite	Federal	101,506	36,911	64,595	35,492	11,834	111,921	160,886	19,377,366
Sequoia-Kings Canyon	Federal	112,467	85,886	26,581	11,307	872	38,760	44,491	6,870,789
TOTAL ALL NATIONAL PARKS	Federal	231,398	122,797	108,601	49,839	12,893	171,333	212,775	27,132,706
	Private	140		140	15		155	61	15,715
	Totals	231,538	122,797	108,741	49,854	12,893	171,488	212,836	27,148,421
State Forests and Parks									
Latour Forest	Private	1,344		1,344			1,344	308	15,162
	State	1,894	450	1,444			1,444	535	21,276
	Totals	3,238	450	2,788			2,788	843	36,438
Calaveras Big Trees Park	Private	120		120	75		195	41	3,982
	State	1,820	72	1,748	1,110	155	3,013	1,190	211,596
	Totals	1,940	72	1,868	1,185	155	3,208	1,831	215,578
TOTAL ALL STATE FORESTS AND PARKS	Private	1,464		1,464	75		1,539	749	19,144
	State	3,714	522	3,192	1,110	155	4,457	2,325	232,872
	Totals	5,178	522	4,656	1,185	155	5,996	2,674	252,016
Totals for California									
TOTAL ALL CONTROL OPERATIONS CALIFORNIA	National Forest	641,545	297,528	344,017	176,279	106,749	627,045	446,860	90,462,432
	National Park	231,398	122,797	108,601	49,839	12,893	171,333	212,775	27,132,706
	Totals	872,943	420,325	452,618	226,118	119,642	798,378	659,635	117,595,138
	Private	618,834	265,067	353,767	154,844	88,892	597,503	373,085	65,581,714
	State	10,748	5,022	5,726	2,395	1,316	9,437	4,943	697,102
	Totals	1,502,525	690,414	812,111	383,357	209,850	1,405,318	1,037,663	183,873,954

TABLE 1 (Continued)

THE STATUS OF RIBES ERADICATION IN THE PACIFIC COAST REGION AS OF DECEMBER 31, 1949

PART B - OREGON

Control Operation	Class of Ownership	Control Units		Status of Ribes Eradication						
		Total Acres	Acres Unworked	Net Acres First Working	Net Acres Second Working	Net Acres Other Workings	Total All Workings			
							Net Acres	Man Days	Ribes Eradicated	
National Forests										
Klamath	Federal	National Forest	5,108		5,108	2,654		7,762	9,533	585,478
		BLM	418		418			836	1,057	71,836
		Totals	5,526		5,526	3,072		8,598	10,590	657,314
		Private	829		829			1,425	2,300	118,759
		Totals	6,355		6,355	3,668		10,023	12,890	776,073
Rogue River		National Forest	64,293	8,672	55,621	32,024	22,517	110,162	52,018	13,954,951
		Private	2,889	281	2,608	1,637	1,542	5,787	1,589	195,896
		Totals	67,182	8,953	58,229	33,661	24,059	115,949	53,607	14,150,847
Siskiyou	Federal	National Forest	51,084	25,410	25,674	9,886		35,560	12,573	574,255
		BLM	75,896	35,690	40,206	14,449		54,655	15,140	604,550
		Totals	126,980	61,100	65,880	24,335		90,215	27,713	1,178,805
		Private	47,705	5,750	41,955	7,672		49,627	10,203	725,026
		State	300		300			300	43	8,328
		Totals	174,985	66,850	108,135	32,007		140,142	37,959	1,912,159
Umpqua	Federal	National Forest	23,520	18,000	5,520			5,520	1,211	31,950
		BLM	6,800	6,000	800			800	17	101
		Totals	30,320	24,000	6,320			6,320	1,228	32,051
		Private	1,000	1,000						
		Totals	31,320	25,000	6,320			6,320	1,228	32,051
TOTAL ALL NATIONAL FORESTS	Federal	National Forest	144,005	52,082	91,923	44,564	22,517	159,004	75,335	15,146,634
		BLM	83,114	41,690	41,424	14,867		56,291	16,214	676,487
		Totals	227,119	93,772	133,347	59,431	22,517	215,295	91,549	15,823,121
		Private	52,423	7,031	45,392	9,905	1,542	56,839	14,092	1,039,681
		State	300		300			300	43	8,328
		Totals	279,842	100,803	179,039	69,336	24,059	272,434	105,684	16,871,130
National Parks										
Crater Lake	Federal	3,782	150	3,632	350	416	4,398	527	149,623	
Totale for Oregon										
TOTAL ALL CONTROL OPERATIONS OREGON	Federal	National Forest	144,005	52,082	91,923	44,564	22,517	159,004	75,335	15,146,634
		National Park	3,782	150	3,632	350	416	4,398	527	149,623
		BLM	83,114	41,690	41,424	14,867		56,291	16,214	676,487
		Totals	230,901	93,922	136,979	59,781	22,933	219,693	92,076	15,972,744
		Private	52,423	7,031	45,392	9,905	1,542	56,839	14,092	1,039,681
		State	300		300			300	43	8,328
		Totals	283,624	100,953	182,671	69,686	24,475	276,832	106,211	17,020,753
PART C - TOTALS FOR THE PACIFIC COAST REGION										
CALIFORNIA AND OREGON	Federal	National Forest	785,550	349,610	435,940	220,843	129,266	786,049	522,195	105,609,066
		National Park	235,180	122,947	112,233	50,189	13,309	175,731	213,302	27,282,329
		BLM	83,114	41,690	41,424	14,867		56,291	16,214	676,487
		Totals	1,103,844	514,247	589,597	285,899	142,575	1,018,071	751,711	133,567,882
		Private	671,257	272,098	399,159	164,749	90,434	654,342	387,177	66,621,395
		State	11,048	5,022	6,026	2,395	1,316	9,737	4,986	705,430
		Totals	1,786,149	791,367	994,782	453,043	234,325	1,682,150	1,143,874	200,894,707

TABLE 2

SUMMARY OF RIBES ERADICATION IN THE PACIFIC COAST REGION - 1949

Control Operation	Class of Work	Acres	Man Days	Ribes Eradicated
California				
Klamath National Forest	Reeradication	1,952	452	21,016
Lassen National Forest	Initial	12,262	4,005	575,063
	Reeradication	11,920	1,714	266,774
	Totals	24,182	5,719	841,837
Plumas National Forest	Initial	2,554	3,296	568,954
	Reeradication	12,336	4,198	579,987
	Totals	14,890	7,494	1,148,941
Eldorado National Forest	Initial	7,188	6,751	1,108,866
	Reeradication	7,202	2,258	316,123
	Totals	14,390	9,009	1,424,989
Stanislaus National Forest	Initial	1,191	995	561,100
	Reeradication	9,136	2,942	609,300
	Totals	10,327	3,937	1,170,400
Sierra National Forest	Initial	4,661	6,155	1,447,514
	Reeradication	2,827	561	76,290
	Totals	7,488	6,716	1,523,804
NATIONAL FOREST TOTALS	Initial	27,856	21,202	4,261,497
	Reeradication	45,373	12,125	1,869,490
	Totals	73,229	33,327	6,130,987
Latour State Forest	Initial	990	176	10,071
Lassen-Volcanic National Park	Reeradication	187	158	4,150
Yosemite National Park	Initial	1,288	3,592	632,249
	Reeradication	9,498	5,159	326,820
	Totals	10,786	8,751	959,069
Sequoia-Kings Canyon National Parks	Initial	2,632	5,134	1,487,844
	Reeradication	1,253	991	48,510
	Totals	3,885	6,125	1,536,354
NATIONAL PARK TOTALS	Initial	3,920	8,726	2,120,093
	Reeradication	10,938	6,308	379,480
	Totals	14,858	15,034	2,499,573
CALIFORNIA TOTALS	Initial	32,766	30,104	6,391,661
	Reeradication	56,311	18,433	2,248,970
	Totals	89,077	48,537	8,640,631
Oregon				
Rogue River National Forest	Initial	1,682	281	26,933
	Reeradication	11,455	3,353	231,372
	Totals	13,137	3,634	258,305
Siskiyou National Forest	Initial	7,448	737	21,794
	Reeradication	14,986	1,033	11,608
	Totals	22,434	1,770	33,402
Klamath National Forest	Initial	430	737	30,763
NATIONAL FOREST TOTALS	Initial	9,560	1,755	79,490
	Reeradication	26,441	4,386	242,980
	Totals	36,001	6,141	322,470
Crater Lake National Park	Reeradication	416	34	6,031
OREGON TOTALS	Initial	9,560	1,755	79,490
	Reeradication	26,857	4,420	249,011
	Totals	36,417	6,175	328,501
Pacific Coast Region				
CALIFORNIA AND OREGON	Initial	42,326	31,859	6,471,151
	Reeradication	83,168	22,853	2,497,981
	Totals	125,494	54,712	8,969,132

TABLE 3

SUMMARY OF RIBES ERADICATION BY AGENCY AND BY LAND OWNERSHIP IN THE PACIFIC COAST REGION - 1949

Work Agency	Acres		Man Days		Ribes Eradicated		Per Worked Acre	Ownership Of Acres Covered				
	Checked and Meeting Standards Without Work	Total	Eradication	Checking	Total	Eradicated		Federal				
							National Forest	National Park	BLM	Total	Private State	
Initial Work												
California:												
B.E.P.Q.	9,165	15,497	5,606	552	6,158	1,088,780	0.61	119	1,735			1,735
Forest Service	13,256	13,349	14,865	355	15,220	3,182,788	1.12	240	9,948			9,948
Park Service	3,920	3,920	8,526	200	8,726	2,120,093	2.18	541		3,920		3,920
Subtotals -	26,741	32,766	28,997	1,107	30,104	6,391,661	1.10	243	11,683	3,920		15,603
Oregon:												600
Forest Service	1,094	2,112	935	83	1,018	57,696	0.85	53	2,002			2,002
Bur. Land Mgmt.	1,195	7,448	580	157	737	21,794	0.49	18	2,926			110
Subtotals -	2,289	9,560	1,515	240	1,755	79,490	0.66	35	4,928			957
Totals -	28,630	42,326	30,512	1,347	31,859	6,471,151	1.07	226	16,611	3,920		3,565
												8,491
												1,067
												17,630
												600
Reeradication												
California:												
B.E.P.Q.	16,440	27,595	6,050	644	6,694	1,226,979	0.37	75	3,102			3,102
Forest Service	11,023	17,778	4,981	450	5,431	642,511	0.45	58	13,757			13,757
Park Service	8,738	10,938	5,814	494	6,308	379,480	0.67	43		10,938		10,938
Subtotals -	36,201	56,311	16,845	1,588	18,433	2,248,970	0.47	62	16,859	10,938		27,797
Oregon:												995
Forest Service	9,253	11,455	2,874	479	3,353	231,372	0.31	25	11,323			11,323
Park Service	261	416	29	5	34	6,031	0.11	23		416		416
Bur. Land Mgmt.	2,354	14,986	938	95	1,033	11,608	0.40	5	6,925			8,061
Subtotals -	11,868	26,857	3,841	579	4,420	249,011	0.32	21	18,248	416		8,061
Totals -	48,069	83,168	20,686	2,167	22,853	2,497,981	0.43	52	35,107	11,354		54,522
												27,651
												995
All Workings												
California:												
B.E.P.Q.	25,605	43,092	11,656	1,196	12,852	2,315,759	0.46	90	4,837			4,837
Forest Service	24,279	31,127	19,846	805	20,651	3,825,299	0.82	158	23,705			23,705
Park Service	12,658	14,858	14,340	694	15,034	2,499,573	1.23	197		14,858		14,858
Subtotals -	62,542	89,077	45,842	2,695	48,537	8,640,631	0.73	138	28,542	14,858		43,400
Oregon:												1,595
Forest Service	10,747	13,567	3,809	562	4,371	289,068	0.37	28	13,325			13,325
Park Service	261	416	29	5	34	6,031	0.11	23		416		416
Bur. Land Mgmt.	3,549	22,434	1,518	252	1,770	33,402	0.43	9	9,851			11,626
Subtotals -	14,157	36,417	5,356	819	6,175	328,501	0.38	23	23,176	416		21,477
Totals -	76,699	125,494	51,198	3,514	54,712	8,969,132	0.67	117	53,718	15,274		78,618
												45,281
												1,595

TABLE 4

SUMMARY OF CHEMICAL SPRAY WORK IN THE
PACIFIC COAST REGION - 1949

Control Operation	Agency	Acres Covered	Total Man Days	Ribes Sprayed	Gal. of Spray Used	Per Acre	
						Man Days	Gal. Spray
Lassen	EQ	5	6	12,000	1,000	1.20	200
Plumas	EQ	124	146	132,800	16,000	1.18	129
Eldorado	FS	172	52	56,550	2,000	0.30	12
Stanislaus	EQ	73	64	41,100	11,350	0.88	155
	FS	209	303	454,000	65,750	1.45	315
Sierra	FS	286	795	796,837	74,475	2.78	260
Yosemite	NPS	138	549	333,232	63,560	3.98	461
Siskiyou	BLM	51	25	11,540	375	0.49	7
Agency Totals	EQ	202	216	185,900	28,350	1.07	140
	FS	667	1,150	1,307,387	142,225	1.72	213
	NPS	138	549	333,232	63,560	3.98	461
	BLM	51	25	11,540	375	0.49	7
Grand Totals		1,058	1,940	1,838,059	234,510	1.83	222
							1,737

TABLE 5

CUMULATIVE SUMMARY OF CHEMICAL SPRAY WORK IN THE
PACIFIC COAST REGION 1946-1949

Control Operation	Agency	Acres Covered	Total Man Days	Ribes Sprayed	Gal. of Spray Used	Per Acre	
						Man Days	Gal. Spray
Lassen	EQ	162	146	75,751	23,275	0.90	144
Plumas	EQ	611	940	1,202,407	175,850	1.54	288
Eldorado	EQ	215	202	84,600	16,745	0.94	78
	FS	597	341	294,400	56,310	0.57	94
Stanislaus	EQ	354	242	245,621	41,900	0.68	118
	FS	837	988	1,839,200	195,500	1.18	234
Sierra	EQ	10	11	3,150	1,724	1.10	172
	FS	853	1,901	2,408,477	241,820	2.23	283
Yosemite	NPS	359	1,306	609,232	200,235	3.64	558
Sequoia-							
Kings Canyon	NPS	133	137	67,409	11,965	1.03	90
Siskiyou	BLM	51	25	11,540	375	0.49	7
	EQ	1,352	1,541	1,611,599	258,494	1.14	192
Agency	FS	2,287	3,230	4,542,077	493,630	1.41	216
Totals	NPS	492	1,443	676,641	212,200	2.93	431
	BLM	51	25	11,540	375	0.49	7
Grand Totals		4,182	6,239	6,841,857	965,699	1.49	231
							1,636

TABLE 6

SUMMARY OF RIBES ERADICATION BY CONTRACT - 1949

Control Operation	Agency	Acres Completed by Contractors	Man Days	Ribes Eradicated	Per Acre		Ave. Bid Price Per Acre	Contract Cost
					Man Days	Ribes		
Initial Work								
California Lassen	EQ	584	135	51,728	0.23	89	\$3.31	\$1,928.50
Plumas	EQ	152	35	4,000	0.23	26	5.70	866.50
Stanislaus	FS	45	23	8,500	0.51	189	5.89	265.05
	EQ	669	326	113,500	0.49	170	5.64	3,770.48
Oregon Rogue River	FS	436	139	25,921	0.32	59	2.76	1,202.85
Siskiyou	BLM	766	400	6,169	0.52	8	6.34	4,856.00
Klamath	FS	430	717	30,763	1.67	72	5.45	2,342.00
Totals		3,082	1,775	240,581	0.57	78	4.94	15,231.38
Reeradication								
California Lassen	EQ	1,274	280	92,761	0.22	73	4.50	5,729.80
Plumas	FS	1,709	659	41,053	0.39	24	4.93	8,422.46
	EQ	158	36	2,213	0.23	14	5.86	926.00
Eldorado	FS	684	378	35,835	0.55	52	4.72	3,231.43
	EQ	734	239	89,193	0.33	122	5.55	4,073.65
Stanislaus	FS	1,683	481	122,300	0.29	72	5.19	8,733.63
	EQ	1,295	271	67,200	0.21	52	3.57	4,623.63
Sierra	FS	1,197	380	57,328	0.32	48	4.32	5,165.49
Oregon Rogue River	FS	7,339	2,108	167,739	0.29	23	3.82	28,042.54
Siskiyou	BLM	922	385	5,668	0.42	61	6.13	5,654.00
Crater Lake	NPS	261	29	6,031	0.11	23	1.10	287.10
Totals		17,256	5,246	687,321	0.30	40	4.34	74,889.73
All Workings								
California Lassen	EQ	1,858	415	144,489	0.22	78	4.12	7,658.30
Plumas	FS	1,709	659	41,053	0.39	24	4.93	8,422.46
	EQ	310	71	6,213	0.23	20	5.78	1,792.50
Eldorado	FS	684	378	35,835	0.55	52	4.72	3,231.43
	EQ	734	239	89,193	0.33	122	5.55	4,073.65
Stanislaus	FS	1,728	504	130,800	0.29	76	5.21	8,998.68
	EQ	1,964	597	180,700	0.30	92	4.27	8,394.11
Sierra	FS	1,197	380	57,328	0.32	48	4.32	5,165.49
Oregon Rogue River	FS	7,775	2,247	193,660	0.29	25	3.76	29,245.39
Siskiyou	BLM	1,688	785	11,837	0.47	7	6.23	10,510.00
Klamath	FS	430	717	30,763	1.67	72	5.45	2,342.00
Crater Lake	NPS	261	29	6,031	0.11	23	1.10	287.10
Totals		20,338	7,021	927,902	0.35	46	\$4.43	\$90,121.11

TABLE 7

CUMULATIVE SUMMARY OF RIBES ERADICATION BY CONTRACT 1946-1949

Control Operation	Agency	Acres Completed By Contractors	Man Days	Ribes Eradicated	Per Acre		Average Bid Price Per Acre	Contract Cost
					Man Days	Ribes		
Initial Work								
California:								
Klamath	FS	469	97	16,545	0.21	35	\$ 4.82	\$ 2,262.00
Lassen	EQ	798	228	67,304	0.29	84	3.67	2,926.51
Plumas	FS	383	656	37,655	1.71	98	7.00	2,680.75
	EQ	152	35	4,000	0.23	26	5.70	866.50
Stanislaus	FS	45	23	8,500	0.51	189	5.89	265.05
	EQ	669	326	113,500	0.49	170	5.64	3,770.48
Oregon:								
Umpqua	FS	1,618	480	19,506	0.30	12	4.19	6,783.70
Rogue	FS	436	139	25,921	0.32	59	2.76	1,202.85
Siakiyou	BLM	766	400	6,169	0.52	8	6.34	4,856.00
Klamath	FS	640	782	41,110	1.22	64	5.30	3,392.00
Totals		5,976	3,166	340,210	0.53	57	4.85	29,005.84
Reeradication								
California:								
Klamath	FS	284	52	1,967	0.18	7	6.75	1,917.00
Lassen	EQ	1,748	766	130,455	0.44	75	5.11	8,925.49
Plumas	FS	4,491	2,076	152,952	0.46	34	5.93	26,619.11
	EQ	158	36	2,213	0.23	14	5.86	926.00
Eldorado	FS	684	378	35,835	0.55	52	4.72	3,231.43
	EQ	1,083	519	103,637	0.48	96	6.66	7,214.73
Stanislaus	FS	1,878	535	128,208	0.28	68	5.05	9,482.93
	EQ	1,609	354	78,707	0.22	49	3.75	6,028.03
Sierra	FS	1,197	380	57,328	0.32	48	4.32	5,165.49
	EQ	620	96	11,038	0.15	18	5.18	3,210.00
Oregon:								
Rogue	FS	18,140	4,436	400,126	0.24	22	4.30	78,025.56
Siakiyou	FS	431	176	3,755	0.41	9	10.32	4,450.00
	BLM	1,693	746	17,743	0.44	10	7.04	11,918.20
Klamath	FS	1,211	392	17,493	0.32	14	4.95	5,998.80
Crater Lake	NPS	261	29	6,031	0.11	23	1.10	287.10
Totals		35,488	10,971	1,147,488	0.31	32	4.89	173,399.87
All Workings								
California:								
Klamath	FS	753	149	18,512	0.20	25	5.55	4,179.00
Lassen	EQ	2,546	994	197,759	0.39	78	4.66	11,852.00
Plumas	FS	4,874	2,732	190,607	0.56	39	6.01	29,299.86
	EQ	310	71	6,213	0.23	20	5.78	1,792.50
Eldorado	FS	684	378	35,835	0.55	52	4.72	3,231.43
	EQ	1,083	519	103,637	0.48	96	6.66	7,214.73
Stanislaus	FS	1,923	558	136,708	0.29	71	5.07	9,747.98
	EQ	2,278	680	192,207	0.30	84	4.30	9,798.51
Sierra	FS	1,197	380	57,328	0.32	48	4.32	5,165.49
	EQ	620	96	11,038	0.15	18	5.18	3,210.00
Oregon:								
Umpqua	FS	1,618	480	19,506	0.30	12	4.19	6,783.70
Rogue	FS	18,576	4,575	426,047	0.25	23	4.27	79,228.41
Siakiyou	FS	431	176	3,755	0.41	9	10.32	4,450.00
	BLM	2,459	1,146	23,912	0.47	10	6.82	16,774.20
Klamath	FS	1,851	1,174	58,603	0.63	32	5.07	9,390.80
Crater Lake	NPS	261	29	6,031	0.11	23	1.10	287.10
Totals		41,464	14,137	1,487,698	0.34	36	\$ 4.88	\$202,405.71

TABLE 8

SUMMARY OF RIBES ERADICATION BY LAND OWNERSHIP AND NUMBER OF WORKING IN THE PACIFIC COAST REGION - 1949

Land Ownership	S t a t u s O f R i b e s E r a d i c a t i o n											
	First Working			Second Working			Other Workings			Totals All Workings		
	Acres	Man Days	Ribes Eradicated	Acres	Man Days	Ribes Eradicated	Acres	Man Days	Ribes Eradicated	Acres	Man Days	Ribes Eradicated
California												
National Forest	11,683	12,262	2,517,038	2,682	1,356	277,386	14,177	2,943	328,259	28,542	16,561	3,122,683
National Park	3,920	8,726	2,120,093	7,816	4,686	341,169	3,122	1,622	38,311	14,858	15,034	2,499,573
Private	16,563	9,010	1,748,118	8,263	3,872	687,781	19,256	3,825	570,304	44,082	16,707	3,006,203
State	600	106	6,412	20	9	213	975	120	5,547	1,595	235	12,172
Totals - - - -	32,766	30,104	6,391,661	18,781	9,923	1,306,549	37,530	8,510	942,421	89,077	48,537	8,640,671
Oregon												
National Forest	4,928	1,349	67,490	13,429	2,370	122,934	4,819	1,392	97,311	23,176	5,111	287,735
National Park							416	34	6,031	416	34	6,031
Bur. Land Mgmt.	3,565	286	7,151	8,061	556	5,239				11,626	842	12,390
Private	1,067	120	4,849	105	58	15,250	27	10	2,246	1,199	188	22,745
Totals - - - -	9,560	1,755	79,490	21,595	2,984	143,423	5,262	1,436	105,388	36,417	6,175	328,501
Pacific Coast Region												
National Forest	16,611	13,611	2,584,528	16,111	3,726	400,320	18,996	4,335	425,570	51,718	21,672	3,410,418
National Park	3,920	8,726	2,120,093	7,816	4,686	341,169	3,538	1,656	44,742	15,274	15,068	2,505,604
Bur. Land Mgmt.	3,565	286	7,151	8,061	556	5,239				11,626	842	12,390
Private	17,630	9,130	1,752,967	8,368	3,930	703,031	19,283	3,835	572,550	45,281	16,895	3,028,548
State	600	106	6,412	20	9	213	975	120	5,547	1,595	235	12,172
Totals - - - -	42,326	31,859	6,471,151	40,376	12,907	1,449,972	42,792	9,946	1,048,009	125,494	54,712	8,969,152

TABLE 9

SUMMARY OF CHECKING IN THE PACIFIC COAST REGION - 1949

Operation	Agency	Regular Check			Advance Check			Post Check		
		Acres Covered	Per Cent of Check	Man Days	Acres Covered	Per Cent of Check	Man Days	Acres Covered	Per Cent of Check	Man Days
Oregon										
Crater Lake	Park Service	261	7.7	5.0	-	-	-	-	-	-
Rogue River	Forest Service	10,110	10.1	337.0	4,700	4.3	63.0	9,550	5.3	142.5
Siskiyou	Bureau of Land Management	3,394	7.7	85.0	10,640	4.5	126.0	3,048	6.0	41.0
	Totals	13,765	9.5	427.0	15,340	4.4	189.0	12,598	5.5	183.5
California										
Klamath	Forest Service	762	8.5	25.5	-	-	-	-	-	-
Lassen	Bureau	8,477	5.8	167.0	36,870	2.9	330.0	20,640	3.6	212.0
Plumas	Bureau	6,417	3.8	53.0	482	2.4	7.5	12,729	3.1	109.5
	Forest Service	4,540	4.6	98.0	2,652	2.5	24.5	17,425	3.6	227.5
Eldorado	Bureau	2,989	5.5	68.0	292	2.5	4.0	9,818	2.5	88.0
	Forest Service	5,895	4.8	131.5	-	-	-	4,914	2.4	40.5
Stanislaus	Bureau	4,389	6.8	67.5	440	2.6	3.5	8,130	3.3	64.0
	Forest Service	2,361	7.1	30.5	1,800	2.5	12.0	4,401	3.3	36.0
Sierra	Forest Service	5,943	4.6	69.0	5,313	2.8	53.5	5,835	4.4	75.0
	Calif. Division of Forestry	162	7.4	3.0	1,520	2.1	19.0	-	-	-
Latour	Park Service	9,074	4.9	144.5	2,464	3.6	43.0	12,544	4.8	200.0
Yosemite	Park Service	3,408	4.6	79.5	2,726	2.0	33.0	3,905	4.6	79.5
Lassen Volcanic	Park Service	-	-	-	-	-	-	14,488	2.8	114.0
Totals		54,417	5.0	937.0	54,559	2.8	530.0	114,829	3.3	1,246.0
Pacific Coast Region										
Totals	All Agencies	68,182	5.9	1,364.0	69,899	3.2	719.0	127,427	3.5	1,429.5

TABLE 10

ANALYSIS OF CHECKING COST AND PRODUCTION IN THE PACIFIC COAST REGION - 1949

State	Class of Check	Man Days	Per Cent of Total Man Days	Strip Acres	Strip Acres Per Man Day	Total Cost	Per Cent of Check	Cost Per Acre	Cost Per Strip Acre
Oregon	Regular	535.1	52	1,301.7	2.4	\$ 6,991.84	9.5	\$0.51	\$5.37
	Advance	252.1	25	680.3	2.7	3,280.59	4.4	0.21	4.82
	Post	230.3	23	690.4	3.0	3,008.84	5.5	0.24	4.36
	All	1,017.5	100	2,672.4	2.6	13,281.27	6.4	0.32	4.97
California	Regular	1,223.5	28	2,810.2	2.3	15,893.90	5.0	0.29	5.66
	Advance	764.4	17	1,525.2	2.0	9,545.07	2.8	0.17	6.26
	Post	1,680.6	38	4,000.3	2.4	22,043.79	3.3	0.19	5.51
	All	3,668.5	84	8,335.7	2.3	47,482.76	3.7	0.21	5.70
Totals Pacific Coast Region	Regular	1,758.6	33	4,111.9	2.3	22,885.74	5.9	0.34	5.57
	Advance	1,016.5	19	2,205.5	2.2	12,825.66	3.2	0.18	5.81
	Post	1,910.9	35	4,690.7	2.5	25,052.63	3.5	0.20	5.34
	All	4,686.0	87	11,008.1	2.3	\$60,764.03	4.6	0.23	\$5.52

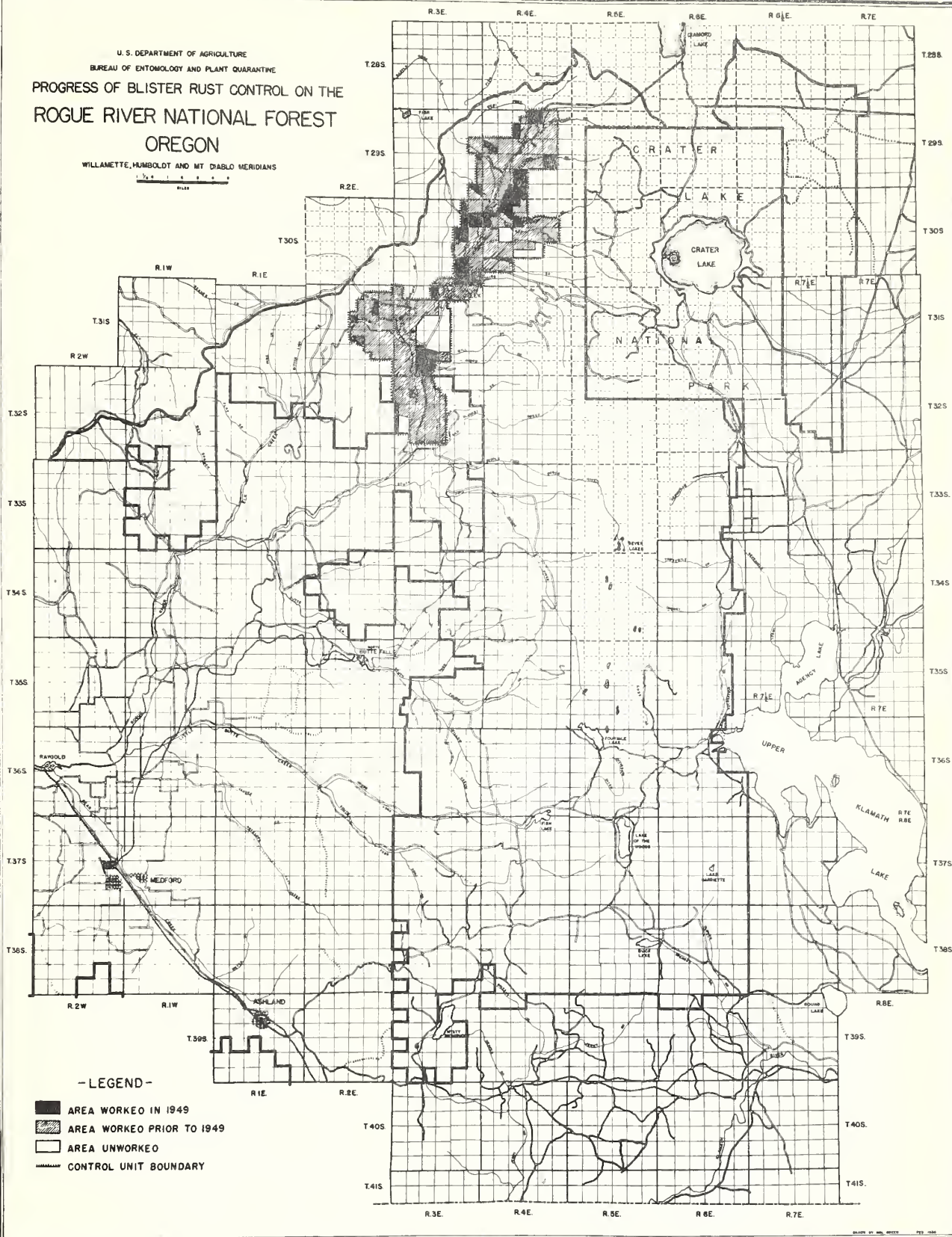
MAPS OF ACTIVE CONTROL OPERATIONS SHOWING
THE STATUS OF BLISTER RUST CONTROL

AS OF DECEMBER 31, 1949

U.S. DEPARTMENT OF AGRICULTURE
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE
PROGRESS OF BLISTER RUST CONTROL ON THE
ROGUE RIVER NATIONAL FOREST
OREGON

WILLAMETTE, HUMBOLDT AND MT. DIABLO MERIDIANS





1 2 3 4 5 6 7 8 9 10
MILES

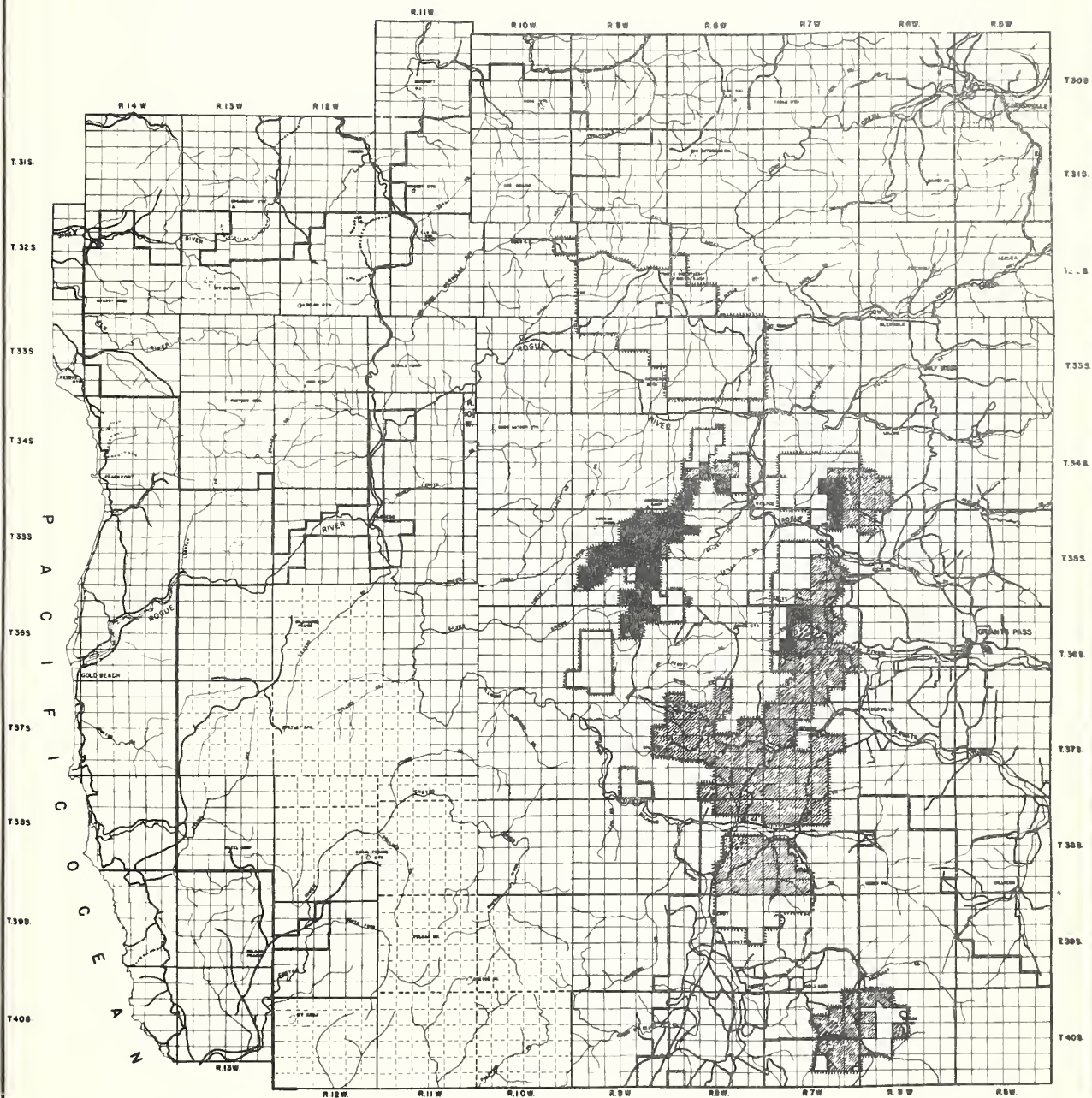


- LEGEND -

- AREA WORKED IN 1949
- AREA WORKED PRIOR TO 1949
- AREA UNWORKED
- CONTROL UNIT BOUNDARY

WILLAMETTE AND HUMBOLDT WILSONS

 AREA WORKED IN 1949
 AREA WORKED PRIOR TO 1949
 AREA UNWORKED
 CONTROL UNIT BOUNDARY







U. S. DEPARTMENT OF AGRICULTURE
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

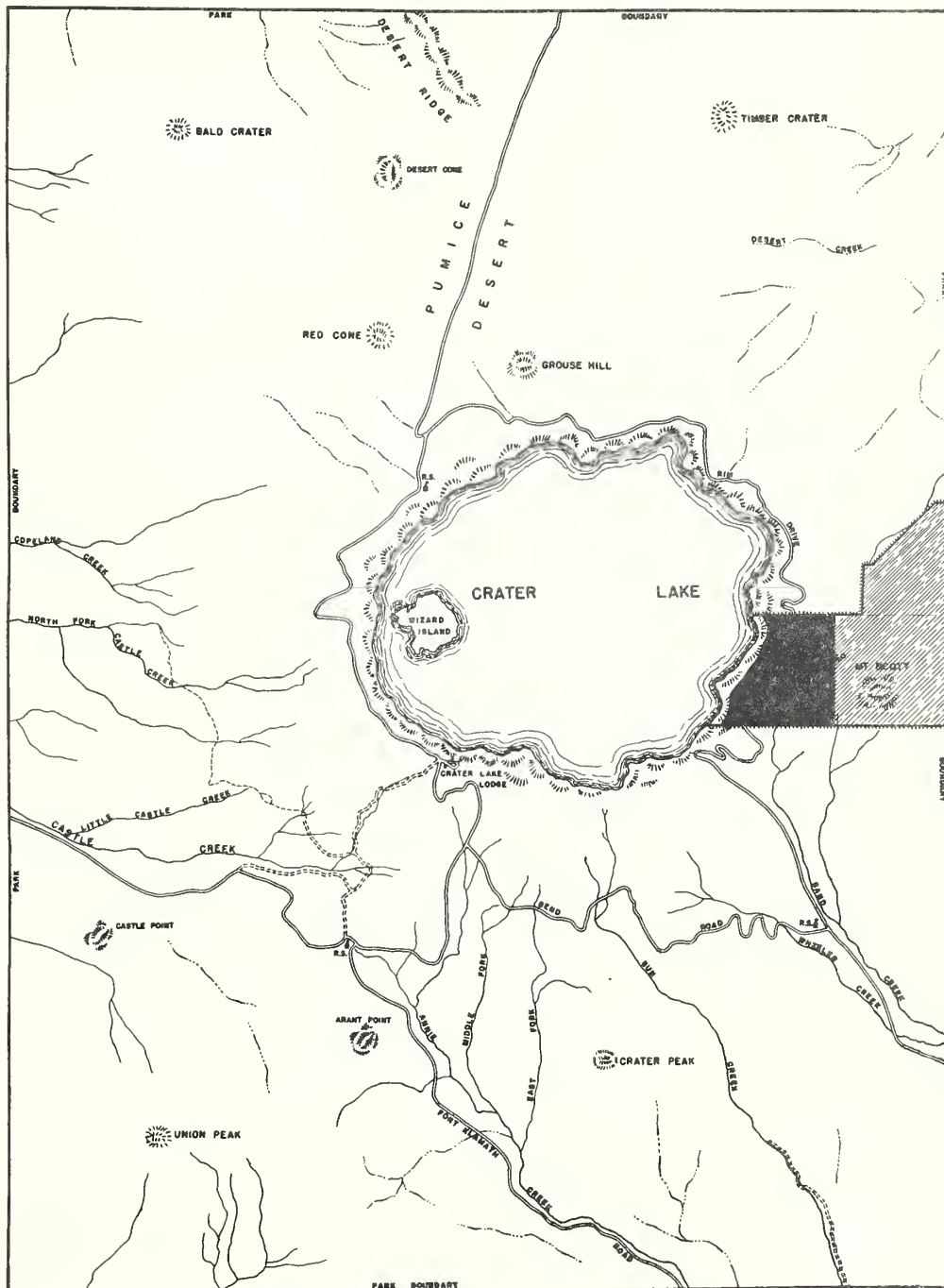
PROGRESS OF BLISTER RUST CONTROL ON THE CRATER LAKE NATIONAL PARK OREGON

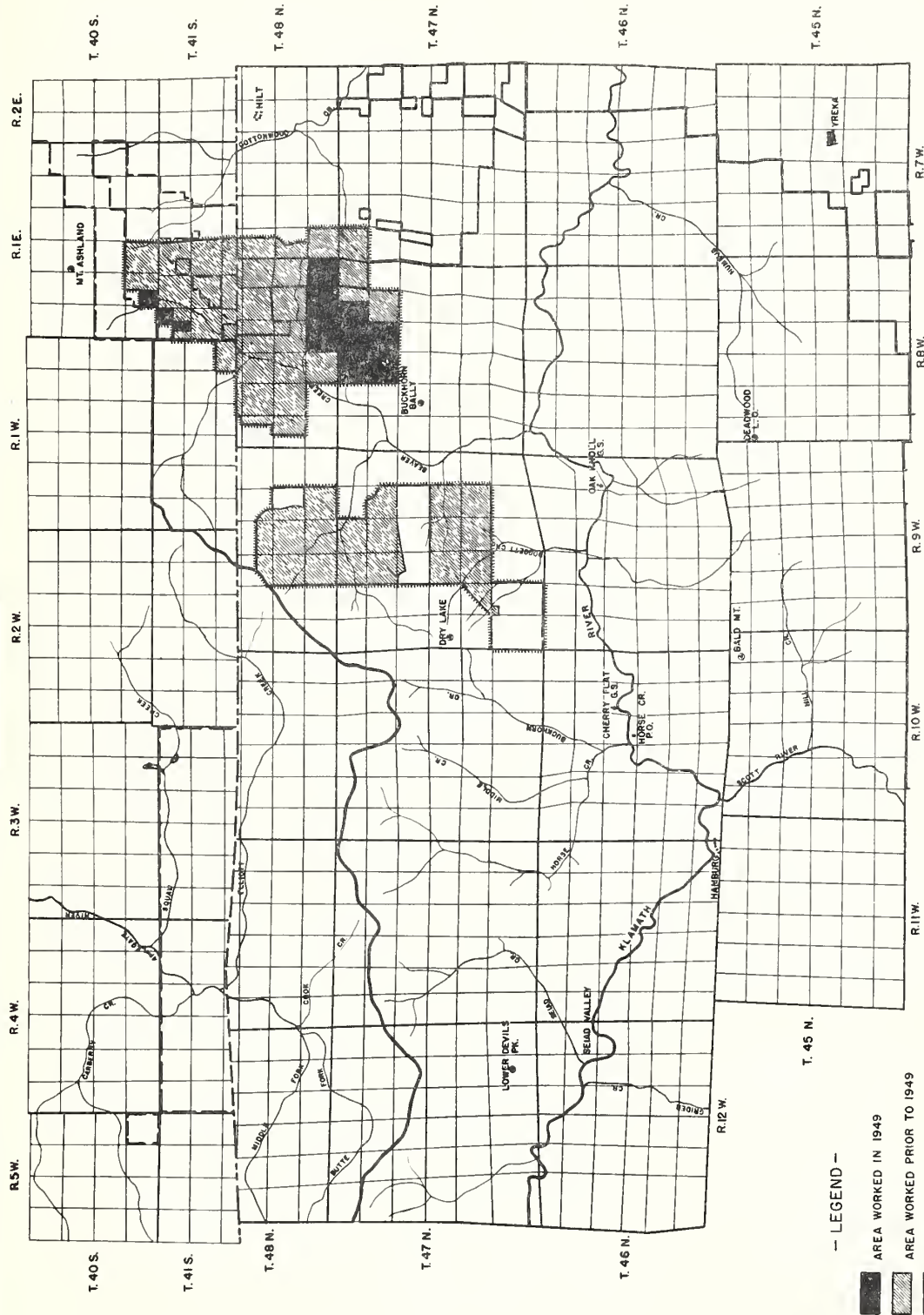
WILLAMETTE MERIDIAN

1 1/2 0 1
SCALE MILES

- LEGEND -

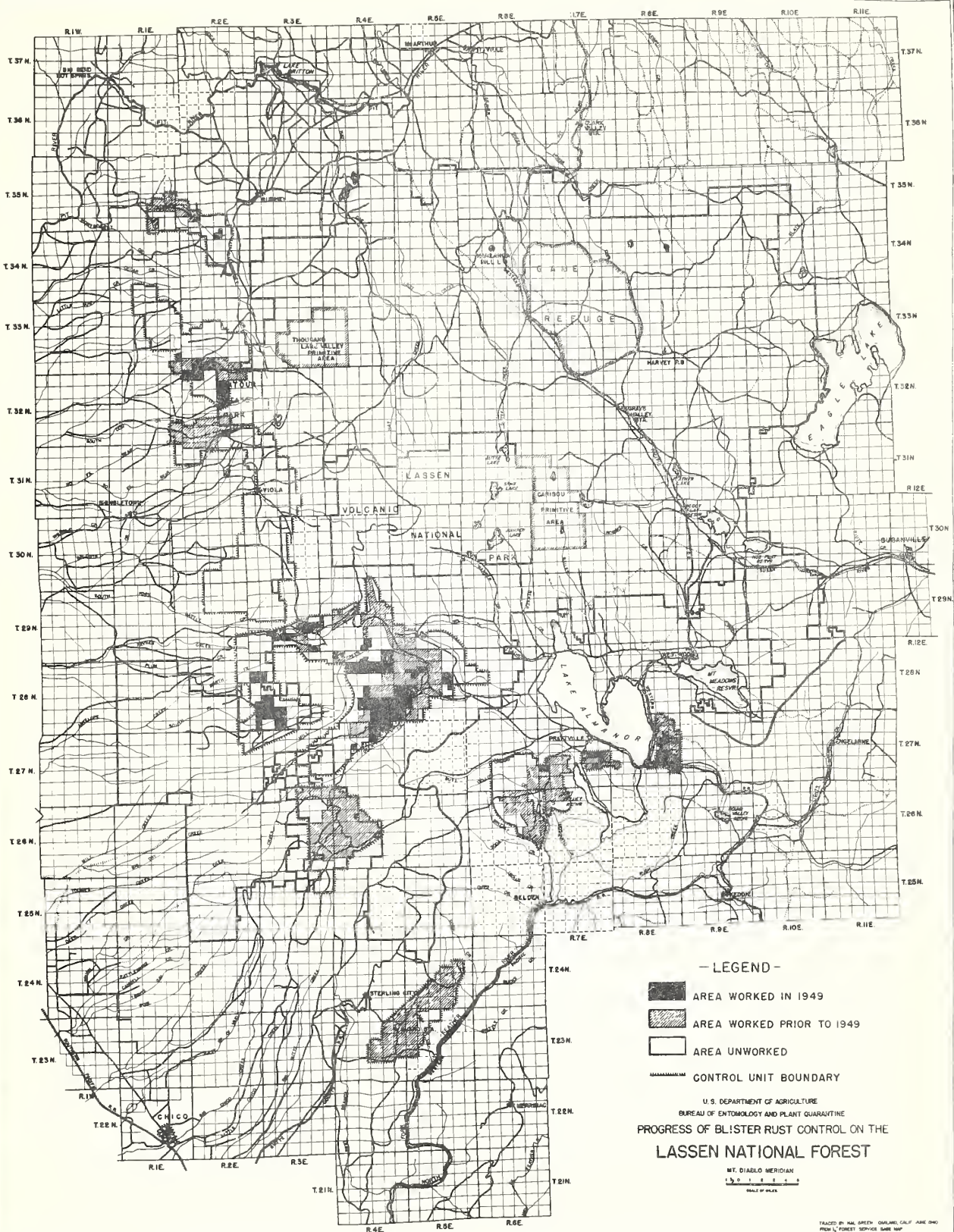
-  AREA WORKED IN 1949
-  AREA WORKED PRIOR TO 1949
-  AREA UNWORKED
-  CONTROL UNIT BOUNDARY

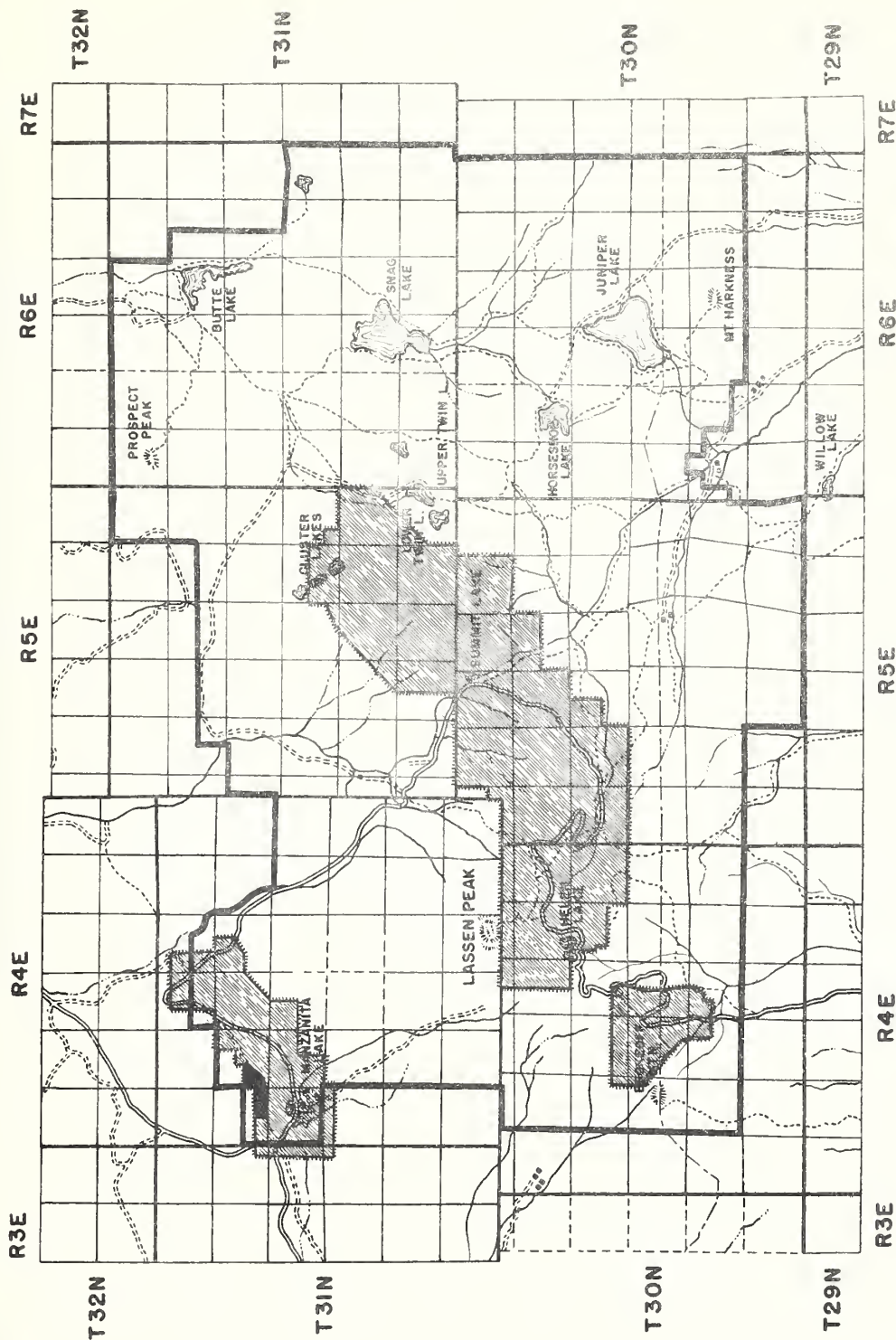




U. S. DEPARTMENT OF AGRICULTURE
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE
PROGRESS OF BLISTER RUST CONTROL ON THE
KLAMATH NATIONAL FOREST
MT. DIABLO AND WILLAMETTE MERIDIANS

FROM 1/4" FOREST SERVICE BASE MAP
E. ROAD ELLIS NOV. 1948



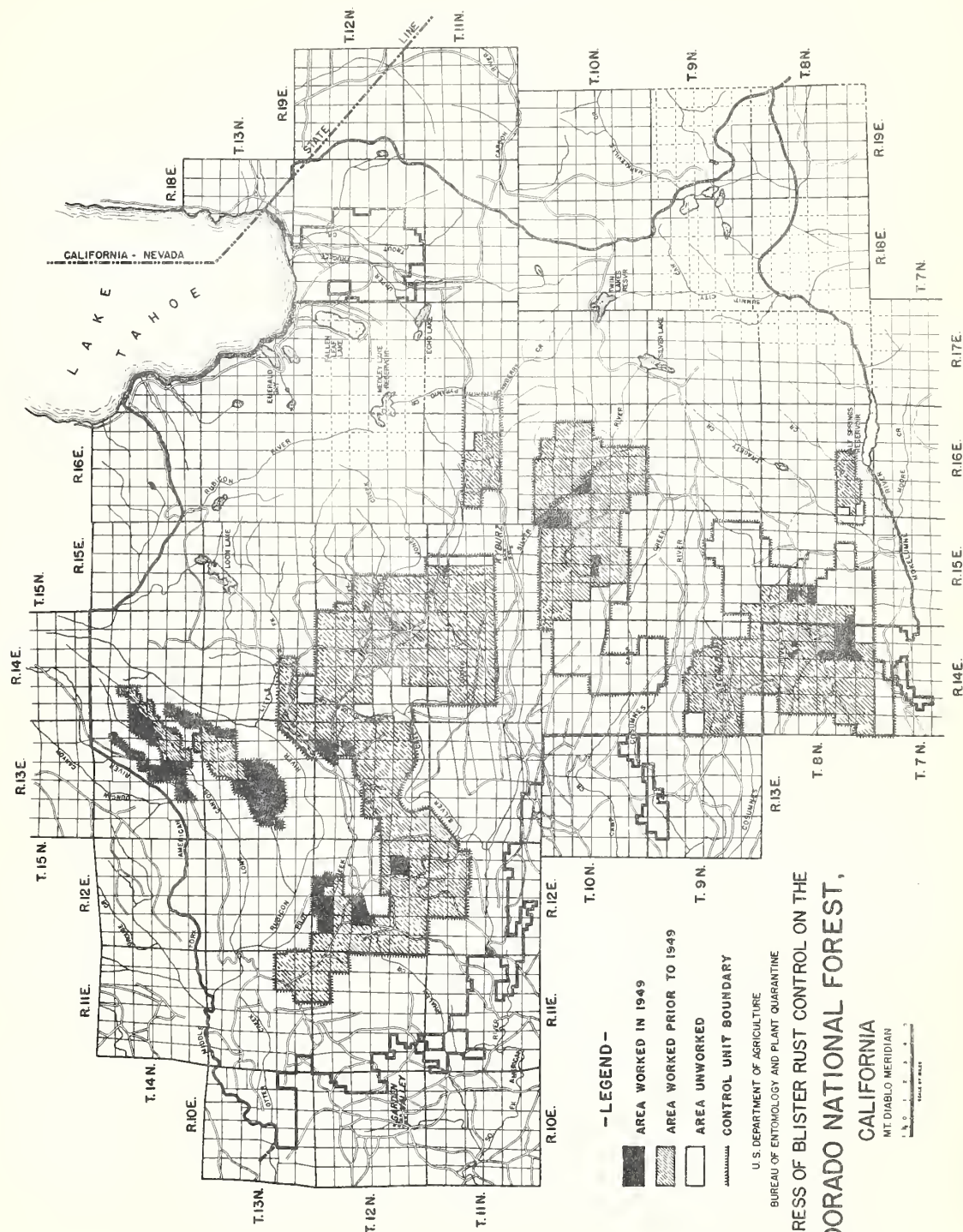


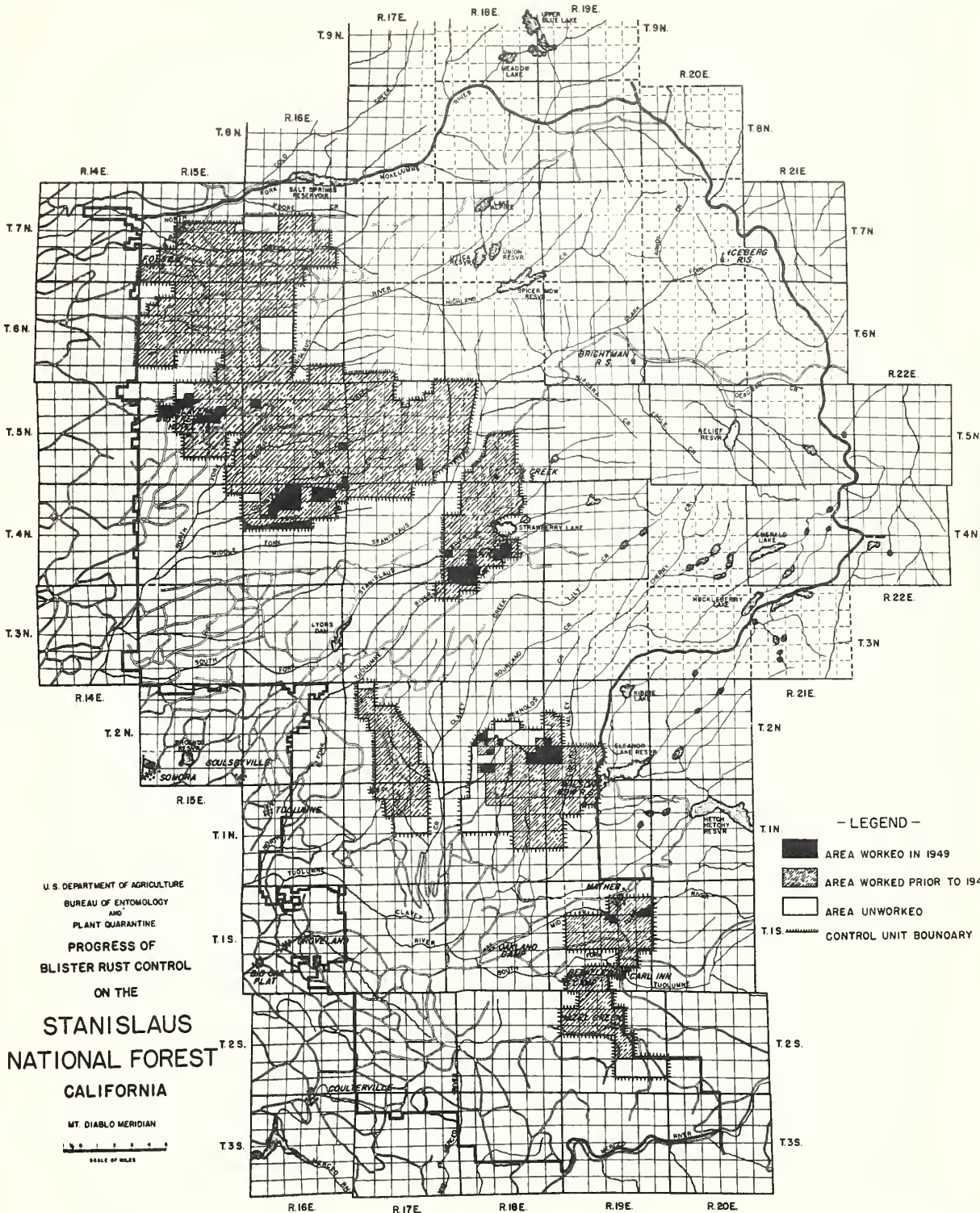
- LEGEND -
 [Solid Black Box] AREA WORKED IN 1949
 [Cross-hatched Box] AREA WORKED PRIOR TO 1949
 [Dashed Line] CONTROL UNIT BOUNDARY

U.S. DEPARTMENT OF AGRICULTURE
 BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

PROGRESS OF BLISTER RUST CONTROL ON THE
LASSEN VOLCANIC NATIONAL PARK.

SCALE 1 1/2 0 1 2 MILES
 - CALIFORNIA - MT. DIABLO MERIDIAN



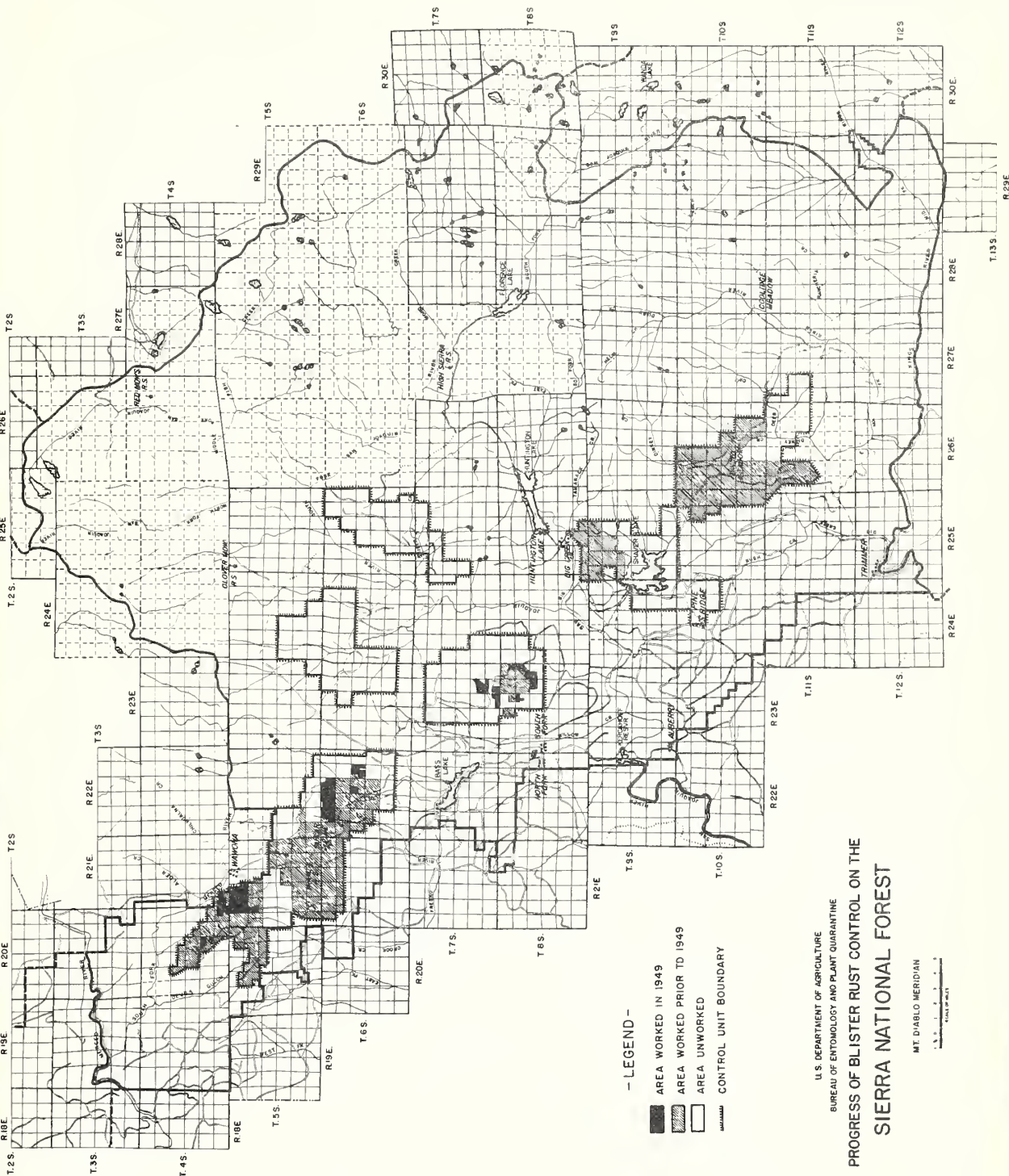


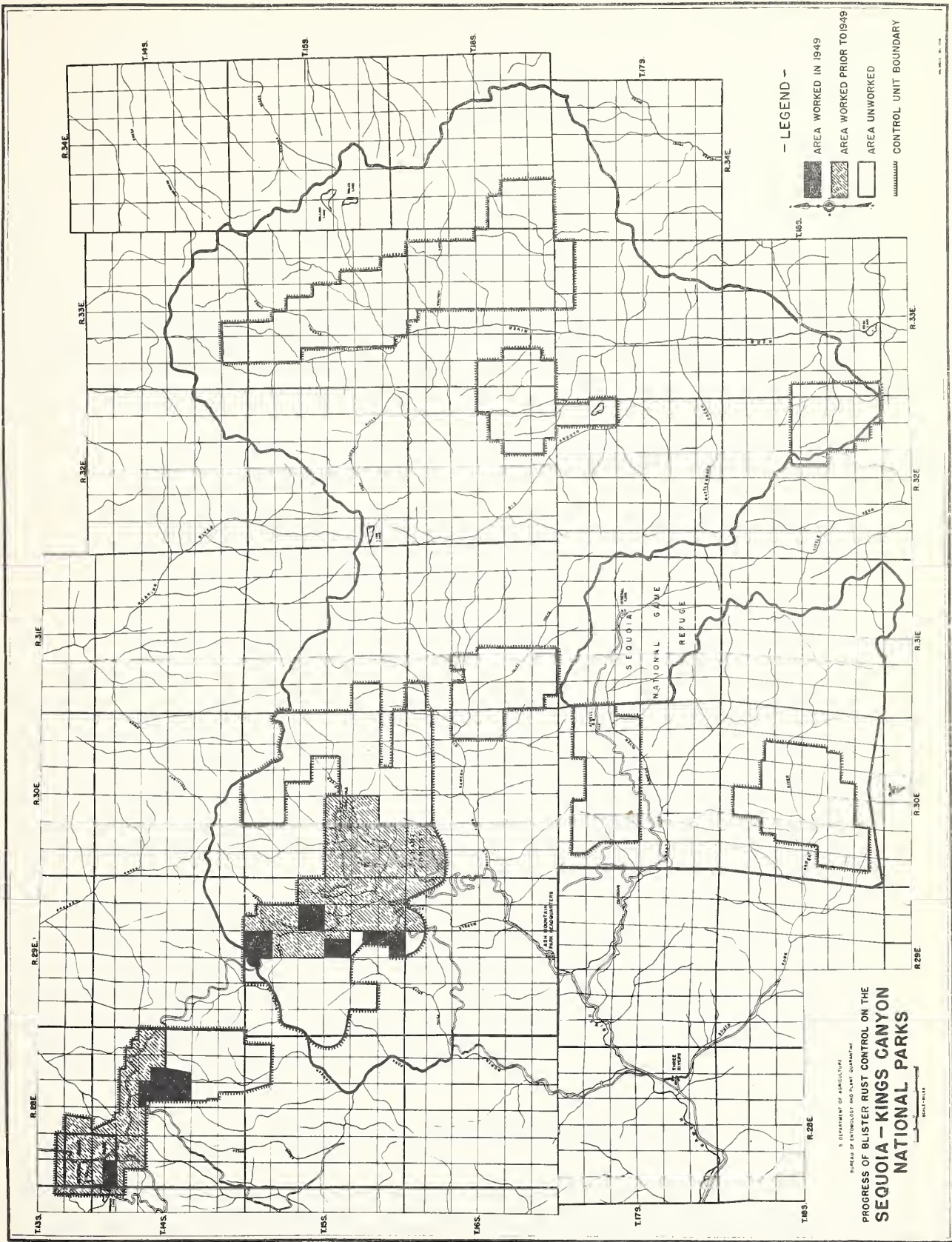
HAL GREEN AUG 1940

AREA WORKED IN 1949
AREA WORKED PRIOR TO 1949
AREA UNWORKED
CONTROL UNIT BOUNDARY



TRACED FROM NATIONAL FIRE SERVICE MAP, VOS-494
BY NAL GREEN OAKLAND, CALIFORNIA MAY 12-60





PART III

COOPERATIVE BLISTER RUST CONTROL ON STATE AND PRIVATE LANDS

Financial Project BLR-3-5

By

R. Riggs Johnston, Agent

ADMINISTRATION

This project, organized to protect selected sugar pine stands in private and state ownership from white pine blister rust, is financed cooperatively from federal, state, and private funds. Since its organization under the Lea Act in 1941 the cooperative project has been one of prime importance. The objectives for the 1949 season were:

1. To conduct control measures on those lands in need of reeradication where deferring work would increase the cost of permanent ribes suppression.
2. To perform initial eradication on recently logged areas that support good sugar pine reproduction and to prevent ribes from fruiting and reseeding on these areas.
3. To curtail rust intensification by removing ribes from known infection centers on state and private lands within control units.

The financial support of the cooperative project by state and private interests makes possible a stabilized program and assures protection to the better stands of sugar pine on state and private lands. The State of California (Department of Natural Resources, Division of Forestry) continued active participation in the cooperative project by an appropriation of \$168,437 for the 1949 fiscal year. This is an increase of \$15,312 over the previous year. The State, in addition to this, contributed services valued at \$53,364 through the assignment of CYA youths to the project. The Michigan-California Lumber Company continued their participation by contributing \$2,000. They have contributed to the project annually since 1942. The Stockton Box Company, a new participant in 1949, also contributed \$2,000 to the cooperative project. Funds contributed by the cooperators were matched with federal monies in accordance with the provisions of the Lea Act. The contributed funds were deposited with the Treasury of the United States and expended under federal regulations through the Bureau's office in Berkeley. All cooperative blister rust control work was confined to California.

LOCATION AND ORGANIZATION OF THE WORK

Location

There still remains within the state a large acreage of state and private lands upon which control work should be performed. The fact that funds are limited and that blister rust infection is appearing within the boundaries of control units make it necessary to select for work areas of

the highest priority. These areas are those on which a further delay of control measures would increase the cost of permanent ribes suppression, and which support a good stand of sugar pine where blister rust is present or likely to become established in the near future.

The camps in 1949 were established on the Lassen, Plumas, Eldorado, and Stanislaus National Forests.

Organization

Ribes Eradication by Hand

The Bureau recruited and employed the personnel, and constructed, maintained, and administered the 6 cooperative camps. The Bureau also furnished technical direction to the two CYA camps. Since college students composed the majority of labor, the active work season was short. During the peak employment period a total of 386 men were working on the cooperative project. This total includes the men working on contracts awarded by the Bureau. The one-man system of ribes eradication was used in all but the two CYA camps. The State Division of Forestry in conjunction with the California Youth Authority operated camps from May till mid-September. The Whitmore CYA camp on the Lassen Forest, which had 30 boys assigned to the project, worked on lands within and adjacent to Latour State Forest. The CYA camp at Dewdrop on the Eldorado Forest performed control work on land principally owned by the Winton Lumber Company; 20 boys were assigned to the project. Both the Division of Forestry and the California Youth Authority should be commended for the fine work turned in by these camps.

Ribes Eradication by Chemicals

The Bureau operated two truck-mounted spray units from June 3 until the end of the active growing season in July. These spray units were used wherever vast numbers of ribes were found. The spray unit on the Plumas Forest was based at the Walters Mine camp and was operated by a crew of four nozzlemen and one foreman. The Grizzly Meadows camp on the Stanislaus Forest was the operating base for the other spray unit. They used a crew of two nozzlemen and one foreman.

The men in all eradication camps were equipped with concentrated 2,4-D herbicide. When rockbound or troublesome ribes were encountered, they were decapitated and the crowns treated with the chemical.

Ribes Eradication Under Contract

The eradication of ribes by contractors during the 1949 season showed a decided increase over that of the previous year. In 1948 contractors removed ribes from a total of 1,971 acres as compared with 4,866 acres in 1949. The first contracts were awarded late in June; others were let periodically up through September. Five contracts were awarded after the close of the field season for work on areas to be covered in 1950. Ribes eradication under contract is now solidly established and has become one of the major procedures in the ribes eradication program.

ACCOMPLISHMENTS

The ribes eradication crews in 1949 removed a total of 2,315,719 ribes from 25,605 acres in 12,852 man days. This is an average of 90 ribes per acre and an expenditure of 0.50 man days per acre. In addition to this, 17,487 acres were systematically examined, classed as meeting control standards, and did not require treatment at this time.

Lassen National Forest

Current Work. Two Bureau camps and one CYA camp were operated on the Lassen Forest. In addition, 12 eradication contracts were awarded and all but two were completed by the end of the 1949 season. Ribes were destroyed on 17,888 acres, and 6,394 acres were found to meet control standards without crew work. Spring camp did initial and reeradication work on the 72,000 acre Deer Creek unit. Work was almost entirely confined to recently cut-over lands or to high-rust-hazard areas. The Last Chance camp commenced initial working of the 22,000 acre Lyonsville unit, which is comprised of old cut-over lands supporting light ribes populations. After the initial working a large portion of this area should meet control standards and be put on maintenance. The Canyon Dam camp on the Plumas Forest worked those adjacent Lassen Forest areas of the Almanor unit. In areas remote from established camps contractors worked a total of 1,858 acres.

At the Whitmore camp, the State Division of Forestry for the fourth successive year eradicated ribes with youths assigned to the project by the California Youth Authority. Considering the difficulties which are encountered with this type of labor, the accomplishment was good.

Future Work. Blister rust infection centers have been found within seven of the nine control units on the Lassen Forest. Control work has prevented spread of the rust from these centers, and hence no appreciable damage has resulted. Areas of high rust hazard must be given close attention to prevent the entrance and intensification of blister rust at new centers.

A small crew at Spring camp in 1950 will be able to complete the treatment of recently logged areas in the Deer Creek unit, after which little further work should be necessary. The Last Chance camp on the Lyonsville unit will nearly complete the initial eradication on this area in 1950. Parts of the Butte Meadows unit will need post check in order to ascertain which lands to work in 1951. Within the Hatchet Mountain unit are located the oldest and most severe blister rust infection centers on the Lassen Forest. A study of the sugar pine values will be made on the cut-over lands within this unit, and from an analysis of these data the areas supporting sufficient sugar pine to warrant protection will be delineated and protected on a local control basis.

The eradication of ribes under contract is well established and will be expanded as rapidly as good contractors become available. Next season we expect to handle small blocks in the Flea Valley, Humbug, Deer Creek, Dan Hunt, and Viola units by this procedure.

It will be advantageous to have the Whitmore CYA camp continue its ribes eradication program. A more intensive program of initial eradication is planned for this camp, due to recent logging and the discovery of blister rust infection in the area.

Plumas National Forest

Current Work. The Bureau operated two eradication camps and awarded two contracts on the Plumas Forest. The Walters Mine camp in the Cascade unit performed reeradication on recently cut-over lands of the Feather River Pine Mills. The vigorous ribes regeneration in this area necessitates treatment at frequent intervals. Reeradication was completed on 2,966 acres which had been worked initially in 1946 and 1947. In addition, 513 acres of more recently cut-over land was treated initially. The chemical spray unit was operated from the Walters Mine camp and covered 124 acres of initial and reeradication work. Work from the Canyon Dam camp was confined to reeradication on the Wolf Creek and Prattville areas. Since much of this area is on a maintenance basis, the ribes were eradicated from small blocks and from stream type. A total of 471 acres on the Plumas Forest and 1,525 acres on the Lassen Forest was worked from this camp.

Eradication contracts were completed for a total of 152 acres of initial work and 158 acres of reeradication.

Future Work. In the Cascade unit all recently logged areas, which total about 2,000 acres, will be critically examined to determine whether sugar pine is reestablishing itself in sufficient quantity to justify protection. This unit of 29,000 acres has had initial treatment on 11,214 acres and reeradication work is up to date.

The 38,000 acre Strawberry unit has had initial treatment on 12,891 acres. The program here is to follow logging by two or three years. All additional necessary work in 1950 can be handled by contracts, which will be drawn up and advertised as the season progresses.

The Greenville unit near Lake Almanor consists of 61,562 acres of which 45,795 acres have received initial treatment. The majority of the unworked area is in virgin timber which should need no work until disturbed. The Long Valley area needs reeradication work on the recently cut-over land, and will be worked in 1950 from the camp at Canyon Dam.

Contracts were awarded at the close of the field season for a total of 718 acres in the Strawberry unit, with work to be completed in 1950.

Eldorado National Forest

Current Work. The Butchers Corral camp treated numerous small blocks in the Pino Grande-Butchers Corral area. With most of the lands in this locality approaching maintenance, only those sites that show vigorous ribes regeneration continue to need periodic treatment. Initial eradication was done on 210 acres in the Pilot Creek drainage. The ribes in this area had been treated with 2,4-D herbicide in 1948, and the presence of blister rust cankers made the follow-up work mandatory in 1949.

The CYA camp at Dew Drop continued to work private land at the south end of the forest. The location of the camp in this area has greatly reduced the work load of paid labor in this locality. They have been keeping up on current work and maintaining control of ribes growth.

Ribes eradication under contract was continued this year. A total of 734 acres of reeradication work was awarded on contracts and was completed by the end of the 1949 field season.

Future Work. There will be no Bureau camps on the Eldorado Forest in 1950. Present plans call for all ribes eradication to be done by contracting. The CYA camp will perform reeradication work on private land at the south end of the forest.

Stanislaus National Forest

Current Work. A twenty-five man crew at Grizzly Meadows continued reeradication work on lands recently logged by the Pickering Lumber Company. This completes the necessary reeradication work in this locality except for two contract blocks which will be worked next year. A chemical unit, which was operated from this camp by a three man crew, sprayed large populations of ribes on two work blocks.

Contract work was stepped up in 1949 with 1,964 acres treated. The work, located in the Dorrington area, included both initial and reeradication.

Future Work. No eradication camps are planned for 1950. All the necessary work will be handled under contract. Contracts to be executed in 1950 were awarded after the close of the field season for an additional 1,347 acres in the Dorrington area. A small camp for checkers and supervisory personnel will be needed in the Jawbone unit to handle the contract program.

Checking

The 30 checkers working on the cooperative project in 1949 inspected a total of 111,673 acres. The checkers completed all necessary regular checking and obtained sufficient post check information for the preliminary planning of the 1950 season.

SUMMARY OF COOPERATIVE RIBES ERADICATION IN CALIFORNIA - 1949

- 57 -

TABLE 2

SUMMARY OF COOPERATIVE RIBES ERADICATION IN CALIFORNIA 1941-1949

Control Operation	Acres	Man Days	Ribes Eradicated	Ownership of Acres Covered		
				Federal	Private	State
Initial Work						
Latour State Forest	2,788	843	36,438	-	1,344	1,444
Lassen	54,813	34,199	5,096,009	8,861	45,925	27
Plumas	17,394	23,933	5,621,390	4,859	12,535	-
Eldorado	20,095	17,655	2,885,747	2,158	17,937	-
Stanislaus	3,318	2,660	746,687	1,814	1,504	-
Sierra	10	11	3,150	-	10	-
Totals	98,418	79,301	14,389,421	17,692	79,255	1,471
Reeradication						
Lassen	41,203	13,065	1,611,820	5,678	35,465	60
Plumas	9,372	4,694	1,063,595	1,391	7,981	-
Eldorado	30,210	13,788	1,466,632	4,792	23,154	2,264
Stanislaus	35,703	14,987	2,281,808	4,517	31,186	-
Calaveras Big Tree State Park	1,125	466	22,525	-	75	1,050
Sierra	8,881	5,676	477,880	4,979	3,902	-
Totals	126,494	52,676	6,924,260	21,357	101,763	3,374
All Workings						
Latour State Forest	2,788	843	36,438	-	1,344	1,444
Lassen	96,016	47,264	6,707,829	14,539	81,390	87
Plumas	26,766	28,627	6,684,985	6,250	20,516	-
Eldorado	50,305	31,443	4,352,379	6,950	41,091	2,264
Stanislaus	39,021	17,647	3,028,495	6,331	32,690	-
Calaveras Big Tree State Park	1,125	466	22,525	-	75	1,050
Sierra	8,891	5,687	481,030	4,979	3,212	-
Totals	224,912	131,977	21,313,681	39,049	181,018	4,845

TABLE 3

SUMMARY OF RIBES ERADICATION BY THE BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE 1925-1940

Control Operation	Acres	Man Days	Ribes Eradicated	Ownership of Acres Covered				
				Federal			Private	State
				National Forest	BIM	Total		
Initial Work								
California:								
Lassen	20,560	4,894	1,022,866	4,660	-	4,660	15,900	-
Plumas	77,039	39,581	9,412,114	21,613	-	21,613	55,386	40
Idorado	103,307	55,283	15,165,858	25,945	-	25,945	74,760	2,602
Stanislaus*	132,591	58,691	19,422,485	25,415	-	25,415	106,769	407
Calaveras Big Trees State Park	1,868	1,339	188,261	-	-	-	120	1,748
Sierra	50,418	76,090	15,995,271	35,638	-	35,638	14,780	-
Oregon:								
Rogue River	140,452	46,630	15,798,559	65,155	5,394	70,549	69,903	-
Siskiyou	57,844	10,789	761,516	6,662	19,539	26,201	31,343	300
Klamath	4,568	6,489	533,529	3,739	-	3,739	829	-
Nursery Sanitation	830	352	5,019	-	-	-	418	412
Mt. Hood	2,649	1,651	194,292	2,649	-	2,649	-	-
Totals	592,126	301,789	78,499,770	191,476	24,933	216,409	370,208	5,509
Reeradication								
California:								
Lassen	1,860	323	11,598	717	-	717	1,143	-
Plumas	19,549	10,984	1,292,965	6,369	-	6,369	13,180	-
Idorado	23,041	13,755	1,196,918	6,693	-	6,693	16,348	-
Stanislaus**	52,883	21,689	5,057,429	24,920	-	24,920	27,963	-
Calaveras Big Trees State Park	215	26	4,792	-	-	-	-	215
Sierra	1,185	1,421	223,582	885	-	885	300	-
Oregon:								
Rogue River	33,142	7,517	939,462	20,950	-	20,950	12,192	-
Mt. Hood	1,766	1,337	357,856	1,766	-	1,766	-	-
Totals	133,641	57,052	9,084,602	62,300	-	62,300	71,126	215
All Workings								
California:								
Lassen	22,420	5,217	1,034,464	5,377	-	5,377	17,043	-
Plumas	96,588	50,565	10,705,079	27,982	-	27,982	68,566	40
Idorado	126,348	69,038	16,362,776	32,638	-	32,638	91,108	2,602
Stanislaus	185,474	80,380	24,479,914	50,335	-	50,335	134,732	407
Calaveras Big Trees State Park	2,083	1,365	193,053	-	-	-	120	1,963
Sierra	51,603	77,511	16,218,853	36,523	-	36,523	15,080	-
Oregon:								
Rogue River	173,594	54,147	16,738,021	86,105	5,394	91,499	82,095	-
Siskiyou	57,844	10,789	761,516	6,662	19,539	26,201	31,343	300
Klamath	4,568	6,489	533,529	3,739	-	3,739	829	-
Nursery Sanitation	830	352	5,019	-	-	-	418	412
Mt. Hood	4,415	2,988	552,148	4,415	-	4,415	-	-
Totals	725,767	358,841	87,584,372	253,776	24,933	278,709	441,334	5,724

*Includes 7,516 acres, 3,905 man days, and 1,217,951 ribes on lands worked by the Bureau of Entomology and Plant Quarantine now in Yosemite National Park.

**Includes 480 acres, 326 man days, and 298,657 ribes on land worked by the Bureau of Entomology and Plant Quarantine now in Yosemite National Park.

PART IV

BLISTER RUST CONTROL BY THE FOREST SERVICE

Financial Project BLR-4

By

Vernon A. Fletcher, Agent

PURPOSE

Protection of selected stands of white and sugar pine under national forest administration from white pine blister rust is the purpose of this project.

The objectives for this year were:

1. To eradicate ribes, working to strict standards, from all areas within control unit boundaries where blister rust infections had been found.
2. To follow logging operations as closely as necessary with eradication work to prevent reseeding by ribes.
3. To continue spraying, with 2,4-D herbicide, concentrations of ribes.
4. To do the reeradication work on all areas as needed.

ORGANIZATION OF PROGRAM

In Oregon the Forest Service operated one 20-man camp, Union Creek, on the Rogue River National Forest.

In California there were 10 camps operated by Forest Service as indicated below:

<u>Forest</u>	<u>Camp</u>	<u>Number of Men</u>	<u>Labor</u>
Klamath	Finley Gulch	12	Regular
Plumas	Meadow Valley	25	Regular
	Mooreville Ridge	50	Prison
Eldorado	Big Meadows	50	Prison
	McCullough	50	Prison
Stanislaus	Bumblebee	35	Regular
	Niagara Creek	15	Regular
Sierra	Whiskey Falls	50	Regular
	Soquel	50	Prison
	Gertrude Creek	50	Regular

A large part of the regular labor was college students. The Bumblebee camp on the Stanislaus and the Gertrude Creek camp on the Sierra were manned by forestry students from Eastern colleges. Inmates from state prisons were used in Region 5 by agreement between the Forest Service and the State of California.

The workers recruited this season showed improvement over previous years. There was a scarcity of satisfactory temporary field supervisors; competent camp superintendents were particularly hard to find.

The Forest Service operated one large power spray unit on the Stanislaus National Forest and two large units on the Sierra National Forest. Some small power spray units were used on other forests to treat ribes with 2,4-D herbicide that could not be sprayed economically with the larger spray units.

The end of the active growing season for ribes determines the end of the spray season, which is late in July. After the spray units were shut down the men were used on eradication work where the ribes concentrations were not of "spray" density.

Contracting of ribes eradication was increased considerably over last year's program. A summary of contract work by national forest for the Region appears in table 6, Part II.

ACCOMPLISHMENTS

Rogue River National Forest

Some adjustments in boundaries of the Upper Rogue unit were made during the year which resulted in about 7,000 acres being added to the unit. Initial work was done on 1,682 acres of this area in 1949 and the remainder should be worked as soon as possible.

The intensive reeradication program started in 1946 was brought close to completion with 11,455 acres being worked during the 1949 season.

Seventy-eight per cent of the acreage covered was done under contract. Initial eradication was done on 436 acres at an average bid price of \$2.76 per acre and 7,339 acres of reeradication work was done at an average bid price of \$3.82 per acre.

Control work remaining to be done in the immediate future is about 5,500 acres of initial work and from 10,000 to 12,000 acres of reeradication work. Current plans schedule a large portion of this job for completion in 1950.

Klamath National Forest

An intensive reeradication program on the Beaver Creek unit, which was started in 1945 and completed in 1948, reduced the ribes populations to a sufficiently low level to make damage to young sugar pine negligible.

To maintain this low level of ribes population, maintenance work was started in 1949. The system used in covering the area was in some measure an experiment. Briefly, 10 men experienced in checking procedure were trained in a modified checker-flanker type of coverage. This crew covered 1,950 acres and eradicated 21,016 ribes with an expenditure of 452 eight-hour man days. As a whole the system shows promise and a complete analysis will be the subject of a special report.

Initial eradication on 430 acres was contracted at an average bid price of \$5.45 per acre.

Continuation of maintenance work using the same type of coverage is recommended for 1950.

Plumas National Forest

Two camps were in operation on the Plumas National Forest in 1949. Meadow Valley camp worked on 535 acres initially and reeradication work was done on 302 acres. All work was on recently logged lands. Mooreville Ridge camp worked initially on 913 acres of virgin timber which will be logged in two or three years. Initial work was also done on 317 acres of recently logged lands, while 872 acres recently cut over were given reeradication treatment.

Reeradication work on 2,615 acres was contracted on the Big Bar unit and the Butterfly unit, of which 1,709 acres was completed. Extensions of time were granted to contractors on the 906 acres not completed. The bid price on these contracts averaged \$4.93 per acre. When all contracts are completed in 1950 the Big Bar unit will require little attention for several years. A few contracts remain to be let on the Butterfly unit next season. In the Merrimac unit about 1,000 acres will require work in 1950, and in the Granite Basin area about 1,500 acres will need attention. The Meadow Valley unit contains another 1,500 acres that should be worked next year.

Because there is blister rust present in the Mooreville Ridge area, initial ribes eradication prior to logging should be stressed because of vigorous ribes regeneration.

Eldorado National Forest

Two camps were operated in the Long Canyon unit in 1949, and completed the initial ribes eradication work that remained in the unit. They also performed the needed reeradication work on 1,060 acres that had been treated in 1938. During the season (June 10 to September 10), 816,000 ribes were destroyed on 7,200 acres.

In the Cat Creek area a five man crew used 2,4-D herbicide and a small power spray unit to treat ribes on 172 acres that supported a concentration of young ribes. The work done in 1949 is expected to hold the ribes population fairly static until the area is in need of a complete eradication job.

In addition to the camp work, 684 acres were contracted for reeradication of ribes in the China Flat and Caldor units. The average bid price for the work was \$4.72 per acre.

The work planned for 1950 is in small blocks situated within the control area between the American River and the Alpine Highway. Contracting of all work is contemplated for 1950.

Stanislaus National Forest

The reeradication work on the Bumblebee area was completed in 1949 except for a few small isolated blocks that can be completed under contract. Working conditions on the area treated this year were very difficult because of the dense brush. Progress was slow and every effort was made to confine work to those blocks of better sugar pine reproduction.

Chemical eradication was continued in the Crane Meadows area from a new camp established at Niagara Creek where two large spray rigs were operated five days a week from June 6 to July 19. Work was confined to old cut-over lands supporting concentrations of ribes. One week was spent on part of the Camp 41 area that was treated in 1946, respraying the areas of heaviest ribes regrowth. After the spray season the camp remained in operation as a hand eradication camp. Initial eradication work was done by hand on lands that did not support ribes in sufficient numbers to warrant spraying.

Special emphasis was placed on expanding the contract program in 1949. Contractors eradicated ribes from 1,728 acres as compared with 195 acres in 1948. This work was done at an average bid price of \$5.21 per acre.

Chemical eradication should be continued from the Niagara Creek camp in 1950. To assist with the initial eradication work on the lands adjacent to and interspersed with the sprayed areas, the men from the spray camp should be kept on hand eradication after the spray season.

It is recommended that all reeradication work needed in 1950 be done under contract. Most of this work is in the Jawbone unit, but a few small blocks are located throughout other units.

Sierra National Forest

Three camps were operated on the Sierra National Forest in 1949. These camps worked 4,393 acres initially and 205 acres of reeradication.

Contracting ribes eradication was started by the Forest Service this year with 1,197 acres of reeradication work being done at an average bid price of \$4.31 per acre.

Two large spray units were operated from the whiskey Falls camp in 1949. During the season, June 9 to July 22, 268 acres of initial spray work and 18 acres of respray work were completed.

The results of the 1948 spray work were reviewed and were encouraging; the ribes kill was about 85 per cent as compared to about 67 per cent for 1947.

Chemical work should be started in 1950 on about 800 acres of ribes concentrations in the Sequel area. Spray work, on the same scale as in 1949, should be continued in the Whiskey Falls unit.

RECOMMENDATIONS

1. Continue to contract ribes eradication.
2. Use spray method of eradication where such treatment is warranted.
3. Priority should be given the classification of areas on each national forest as regards management for sugar pine.
4. Manage control work to keep ribes from fruiting and reseeding on cut-over areas.
5. Press control work where blister rust infections are present.

TABLE 1

SUMMARY OF RIBES ERADICATION BY THE FOREST SERVICE - 1949

National Forest	Acres		Man Days			Ribes Eradicated	Per Worked Acre	Ownership of Acres Covered			
	Worked	Checked and Meeting Standards Without Work	Eradication	Checking	Total			Bradi-cation Man Days	National Forest	Private	
Initial Work											
California:											
Plumas	1,765	93	1,858	2,679	45	2,724	405,920	1.52	230	1,158	700
Eldorado	6,308	-	6,308	5,551	150	5,701	881,754	0.88	140	3,778	2,530
Stanislaus	522	-	522	618	22	640	447,600	1.18	857	351	171
Sierra	4,661	-	4,661	6,017	138	6,155	1,447,514	1.29	311	4,661	-
Subtotals	13,256	93	13,349	14,865	355	15,220	3,182,788	1.12	240	9,948	3,401
Oregon:											
Rogue River	664	1,018	1,682	218	63	281	26,933	0.33	41	1,572	110
Klamath	430	-	430	717 ^u	20	737	30,763	1.67	72	430	-
Subtotals	1,094	1,018	2,112	935	83	1,018	57,696	0.85	53	2,002	110
Totals	14,350	1,111	15,461	15,800	438	16,238	3,240,484	1.10	226	11,950	3,511
Reeradication											
California:											
Klamath	1,952	-	1,952	446	6	452	21,016	0.23	11	910	1,042
Plumas	2,883	3,837	6,720	1,599	305	1,904	141,939	0.55	49	5,237	1,483
Eldorado	1,744	349	2,093	861	22	883	71,366	0.49	41	889	1,204
Stanislaus	3,024	1,162	4,186	1,574	57	1,631	331,900	0.52	110	3,894	292
Sierra	1,420	1,407	2,827	501	60	561	76,290	0.35	54	2,827	-
Subtotals	11,023	6,755	17,778	4,981	450	5,431	642,511	0.45	58	13,757	4,021
Oregon:											
Rogue River	9,253	2,202	11,455	2,874	479	3,353	231,372	0.31	25	11,323	132
Totals	20,276	8,957	29,233	7,855	929	8,784	873,883	0.39	43	25,080	4,153
All Workings											
California:											
Klamath	1,952	-	1,952	446	6	452	21,016	0.23	11	910	1,042
Plumas	4,648	3,930	8,578	4,278	350	4,628	547,859	0.92	118	6,395	2,183
Eldorado	8,092	349	8,441	6,412	172	6,584	953,120	0.80	118	4,667	3,734
Stanislaus	3,546	1,162	4,708	2,192	79	2,271	779,500	0.62	220	4,245	463
Sierra	6,081	1,407	7,488	6,518	198	6,716	1,523,804	1.07	251	7,488	-
Subtotals	24,279	6,848	31,127	19,846	805	20,651	3,825,299	0.82	158	23,705	7,422
Oregon:											
Rogue River	9,917	3,220	13,137	3,092	542	3,634	258,305	0.31	26	12,895	242
Klamath	430	-	430	717	20	737	30,763	1.67	72	430	-
Subtotals	10,347	3,220	13,567	3,809	562	4,371	289,068	0.37	28	13,325	242
Totals	34,626	10,068	44,694	23,655	1,367	25,022	4,114,367	0.68	119	37,030	7,664

*Includes 570 man days Sierra Foresters Boys Club.



TABLE 2

SUMMARY OF RIBES ERADICATION BY THE
FOREST SERVICE 1933-1949

National Forest	Acres	Man Days	Ribes Eradicated	Ownership of Acres Covered				
				Federal			Private	State
				National Forest	BLM	Total		
Initial Work								
California:								
Klamath	30,312	30,911	2,877,938	8,874	-	8,874	21,438	-
Lassen	19,087	16,936	1,941,142	2,716	-	2,716	16,371	-
Plumas	84,205	82,306	13,091,992	67,742	-	67,742	16,463	-
Eldorado	60,026	41,533	9,873,138	51,122	-	51,122	8,904	-
*Stanislaus	61,616	35,325	10,026,213	54,542	-	54,542	7,074	-
Sierra	19,723	47,020	11,487,275	18,337	-	18,337	1,386	-
Oregon:								
Umpqua	6,320	1,228	32,051	5,520	800	6,320	-	-
Rogue River	2,794	1,525	166,964	2,684	-	2,684	110	-
Siskiyou	10,319	5,820	210,745	6,275	2,118	8,393	1,926	-
Klamath	2,720	4,980	354,447	1,790	930	2,720	-	-
Plantations	680	373	124,744	680	-	680	-	-
Totals	297,802	267,957	50,186,649	220,282	3,848	224,130	73,672	
Reeradication								
California:								
Klamath	18,701	13,776	473,761	8,954	-	8,954	9,707	40
Lassen	4,779	2,346	204,095	622	-	622	4,157	-
Plumas	104,507	58,772	6,765,172	59,354	-	59,354	45,153	-
Eldorado	64,165	36,771	2,891,478	36,725	-	36,725	27,440	-
Stanislaus	90,811	52,064	6,054,079	69,681	-	69,681	21,130	-
Sierra	54,934	40,053	11,428,465	46,559	-	46,559	8,375	
Oregon								
Rogue River	46,588	19,599	1,265,733	44,036	-	44,036	2,552	-
Siskiyou	1,661	1,092	18,051	666	875	1,541	120	-
Klamath	4,727	3,233	69,514	3,647	557	4,204	523	-
Plantations	212	228	29,957	212	-	212	-	-
Totals	391,085	227,934	29,200,305	270,456	1,432	271,888	119,157	40
All Workings								
California								
Klamath	49,013	44,687	3,351,699	17,828	-	17,828	31,145	40
Lassen	23,866	19,282	2,145,237	3,338	-	3,338	20,528	-
Plumas	188,712	141,078	19,857,164	127,096	-	127,096	61,616	-
Eldorado	124,191	78,304	12,764,616	87,847	-	87,847	36,344	-
Stanislaus	152,427	87,389	16,080,292	124,223	-	124,223	28,204	-
Sierra	74,657	87,073	22,915,740	64,896	-	64,896	9,761	-
Oregon								
Umpqua	6,320	1,228	32,051	5,520	800	6,320	-	-
Rogue River	49,382	21,124	1,432,697	46,720	-	46,720	2,662	-
Siskiyou	11,980	6,912	228,736	6,941	2,993	9,934	2,046	-
Klamath	7,447	8,213	423,961	5,437	1,487	6,924	523	-
Plantations	892	601	154,701	892	-	892	-	-
Totals	688,887	495,891	79,386,954	490,738	5,280	496,018	192,829	40

*Includes 690 acres, 1,672 man days and 493,900 ribes on lands worked by the Forest Service now in Yosemite National Park.

PART V

BLISTER RUST CONTROL BY THE NATIONAL PARK SERVICE

Financial Project BLR-5

By

S. Daryl Adams, Agent

ADMINISTRATION

The purpose of this project is to protect from blister rust the white pine stands having aesthetic and recreational value within the National Parks. During 1949 the immediate aim was to complete all needed reeradication work and to continue the initial eradication of ribes on areas of high priority.

The Memorandum of Understanding entered into by the Departments of Agriculture and the Interior in June 1945, remained in effect during 1949. This agreement authorizes the office of Blister Rust Control and Region 4 of the National Park Service to develop and execute cooperative control programs to accomplish the maximum benefits in the most efficient manner.

ACCOMPLISHMENTS

SUMMARY OF PARK SERVICE WORK BY CAMP - 1949

Camp	Size of Camp	Total Acres Covered	Total Man Days	Total Ribes Destroyed
Yosemite National Park				
Carl Inn	50	3,044	1,788	74,694
Crane Flat	50	1,588	1,848	120,346
Sugar Pine Pass	50	250	984	213,975
Chinquapin	50	2,798	1,623	114,000
Wawona	50	2,968	1,959	102,822
Chemical Project		138	549	333,232
Park Totals		10,786	8,751	959,069
Sequoia-Kings Canyon National Parks				
Redwood Mountain	50	1,693	2,235	389,152
Red Fir	50	1,622	1,946	167,887
Marble Fork	50	570	1,944	979,315
Park Totals		3,885	6,125	1,536,354
Lassen Volcanic National Park				
No Camp		187	158	4,150
Crater Lake National Park				
Contract Work		416	34	6,031
All National Parks				
Hand Erad. (Camp)		14,720	14,485	2,166,341
Chemical Project		138	549	333,232
Contract Work		416	34	6,031
Grand Totals		15,274	15,068	2,505,604

Yosemite National Park

The severe winter of 1948-49 caused considerable damage to the camp installations at Sugar Pine Pass and Crane Flat. However, only minor repairs were needed at Carl Inn, Chinquapin, and Wawona to make these camps ready for occupancy. Because of a shortage of funds the camps did not start working at full strength until after the Fourth of July. The six-day week was used for a short period during the latter part of the season. The chemical spray program did not get underway until June 10 because of the late development of the ribes plants. A reappraisal of all blister-rust-control units was made and the results will be submitted in a separate report later this winter.

The Carl Inn crews completed all work in the vicinity of Aspen Valley and Ackerson Meadows. At the end of the season the camp facilities were dismantled and moved to the new camp site at Mather Intake, about 5 miles east of the San Francisco Municipal camp.

At Crane Flat the crews spent most of the season working between the South Fork of the Tuolumne River and the new Tioga Road. The initial work progressed slowly because of the heavy population of ribes, the dense brush cover and the long walks necessary to reach the job.

At Sugar Pine Pass two large spray rigs, one a crash truck and the other a Hardie sprayer mounted on runners and moved from one setting to another by a caterpillar, were used to treat 118 acres of initial area and 20 acres of respray area. In addition, some hand eradication work was done. The spray job should be completed here next season if both spray rigs are available. Since much emphasis has been put on the spray program the reeradication work in this area has fallen behind schedule.

The Chinquapin camp continued working in the vicinity of the Wawona and Glacier Point roads. Although the camp got off to a late start excellent progress was made this season. Much work remains to be done in this camp area.

From the Wawona camp reeradication work was done in the vicinity of Wawona and the Mariposa Grove of Big Trees. Another season's work remains on the latter area, after which no camp will be needed at Wawona for three or four years.

RECOMMENDATIONS

The Yosemite National Park work plan for 1950 should give consideration to the following points:

1. Complete all reeradication work in the Wawona area.
2. Complete the chemical spray job at Sugar Pine Pass.
3. Rework all 1947-48 spray areas by hand eradication methods.

4. Establish a new camp at Mather Intake. (This camp should not be an elaborate set up, since it will be used about two seasons only.)
5. Establish a pack camp of temporary construction housing about 33 men on the South Fork of the Tuolumne River at the Aspen Valley trail crossing. If possible, operate this camp on a six-day week basis for the next two or three seasons to work out an area between Carl Inn and Crane Flat camps that can not be reached from either camp site.

Sequoia-Kings Canyon National Parks

On the Sequoia-Kings Canyon National Parks camps were again operated at Redwood Mountain, Red Fir, and Marble Fork. The first two camps were activated on June 13 and Marble Fork on June 20. Early season progress was good because all supervisory personnel and a high percentage of the eradicators were experienced blister-rust-control workers.

The Redwood Mountain crews completed the initial eradication work in the immediate vicinity of the camp area and continued southward in Redwood Canyon. One-half section of reeradication work was done in the Grant Grove unit. Twenty-six man days were spent on chemical respray in the Big Stump area and along roadsides. The next two seasons will be required to complete the initial eradication in Redwood Canyon and bring the Grant Grove reeradication work up to date.

The crews at Red Fir completed the reeradication work needed there and continued the initial eradication work in the vicinity of Lost Grove. All initial work in this camp area will be completed next season and the reeradication work required at Giant Forest will be brought up to date. A large portion of the latter area will require very little work to put it on a maintenance basis.

Only initial eradication work was performed at the Marble Fork camp. One section supporting heavy concentrations of Ribes tularense accounted for most of the man days spent at this camp. Except for 160 acres of R. tularense area, which should be deferred until a more economical method of destroying this species is developed, all remaining initial eradication work can be completed on this camp area next season by a 25-man crew.

In addition this crew will be able to aid in the reeradication work at Giant Forest. In the future a 25-man camp will be able to handle the reeradication program on the Marble Fork area.

RECOMMENDATIONS

In Sequoia-Kings Canyon National Parks the same three camps should be operated again in 1950. Their work plans should be as follows:

1. At Red Fir priority should be given to the completion of the initial work at Lost Grove and all additional time should be devoted to reeradication work at Giant Forest.

2. Marble Fork should be reduced to a 25-man camp; the additional men normally assigned here could be used effectively at Redwood Mountain to speed up the initial work in Redwood Canyon and to do the reeradication work needed at Grant Grove.

Crater Lake National Park

During 1946 a post check over the Cloud Cap unit showed 3,371 acres to be on maintenance. Of the 416 acres requiring further examination only 216 acres required actual eradication work; the remaining 155 acres were checked and met the control standards without work. Two college students were awarded a contract to complete this work for \$1.10 per acre and did an excellent job. Intensive inspections and systematic checks revealed that less than 1/2 ribes and 1/2 foot of live stem per acre remained following the contract job.

That portion of the Cloud Cap unit lying above the crater rim will need no further attention for the next five or six years, insofar as ribes are concerned. However, yearly examinations should be made for possible blister rust infection on white bark pine along the crater rim. Should infection be found the ribes remaining on the untreated portion of the unit on the crater walls may need attention.

Lassen Volcanic National Park

In Lassen Volcanic National Park there are 17,565 acres in the control units, all of which have been worked initially. By the end of the 1945 season a second coverage of 5,389 acres had been made, of which 3,055 acres required crew work and 2,334 acres needed no additional work. On much of the area ribes are suppressed to the point where a maintenance condition exists and no further work will be necessary unless a local disturbance makes conditions favorable for ribes regeneration.

A general examination of control units in 1948 showed that one small area near Manzanita Lake required reeradication work early in 1949 to hold ribes in suppression. Hence, during 1949 an area of 187 acres was worked, requiring 158 man days to remove 4,150 ribes bushes. During 1949 a systematic sampling of 14,448 acres was made to determine what portions of the area are not yet on maintenance. A preliminary review indicates that reeradication work will be necessary on about 2,000 acres.

The plan for 1950 is to work all areas in the park that need treatment to hold ribes in suppression. After 1950 no work should be needed for several years.

TABLE 1

SUMMARY OF RIBES ERADICATION BY THE NATIONAL PARK SERVICE - 1949

National Park	Acres		Man Days		Ribes Eradicated	Per Worked acre	
	Worked	Checked and Meeting Standards Without Work	Total	Eradication	Checking	Total	Eradi- cation Man Days
Initial Work							
Yosemite	1,288	-	1,288	3,553	39	3,592	2.76 491
Sequoia-Kings Canyon	2,632	-	2,632	4,973	161	5,134	1.89 565
Total	3,920	-	3,920	8,526	200	8,726	2.18 541
Reeradication							
Crater Lake	261	155	416	29	5	34	0.11 23
Lassen Volcanic	187	-	187	44	114	158	0.24 22
Yosemite	7,298	2,200	9,498	4,810	349	5,159	0.66 45
Sequoia-Kings Canyon	1,253	-	1,253	960	31	991	0.77 39
Subtotal - Calif.	8,738	2,200	10,938	5,814	494	6,308	0.67 43
Total	8,999	2,355	11,354	5,843	499	6,342	0.65 43
All Workings							
Crater Lake	261	155	416	29	5	34	0.11 23
Lassen Volcanic	187	-	187	44	114	158	0.24 22
Yosemite	8,586	2,200	10,786	8,363	388	8,751	0.97 112
Sequoia-Kings Canyon	3,885	-	3,885	5,933	192	6,125	1.53 395
Subtotal - Calif.	12,658	2,200	14,858	14,340	694	15,034	1.13 197
Total	12,919	2,355	15,274	14,369	699	15,068	1.11 194

*All Federal Ownership

TABLE 2

SUMMARY OF RIBES ERADICATION BY THE
NATIONAL PARK SERVICE 1933-1949

National Park	Acres	Man Days	Ribes Eradicated	Ownership of Acres Covered	
				Federal	Private
Initial Work					
Crater Lake	3,632	412	130,162	3,632	-
Lassen Volcanic	17,565	5,734	771,673	17,425	140
Yosemite*	56,389	101,509	12,707,081	56,389	-
Sequoia-Kings Canyon	26,581	37,298	6,264,113	26,581	-
Totals	104,167	144,953	19,873,029	104,027	140
Reeradication					
Crater Lake	766	115	19,461	766	-
Lassen Volcanic	3,242	1,725	128,593	3,227	15
Yosemite**	46,846	53,474	4,659,777	46,846	-
Sequoia-Kings Canyon	12,179	7,193	606,676	12,179	-
Totals	63,033	62,507	5,414,507	63,018	15
All Workings					
Crater Lake	4,398	527	149,623	4,398	-
Lassen Volcanic	20,807	7,459	900,266	20,652	155
Yosemite	103,235	154,983	17,366,858	103,235	-
Sequoia-Kings Canyon	38,760	44,491	6,870,789	38,760	-
Totals	167,200	207,460	25,287,536	167,045	155

*In addition 8,206 acres, 5,577 man days and 1,711,851 ribes on lands worked by the Forest Service and the Bureau of Entomology and Plant Quarantine are now in Yosemite National Park.

**In addition 480 acres, 326 man days and 298,657 ribes on lands worked by the Bureau of Entomology and Plant Quarantine are now in Yosemite National Park.

TABLE 3

STATUS OF RIBES ERADICATION ON CLASS A PRIORITY AREAS
IN THE NATIONAL PARKS AS OF
DECEMBER 31, 1949

Area	Acres					
	Total	In- itially Worked	Un- worked	*Reeradi- cation		Rework Required in 1950
				2nd Work	Other Work	
Yosemite National Park						
Priority A-1						
Big Oak Flat Road	9,203	9,203	-	8,863	5,849	2,580
Wawona Road	6,491	6,491	-	4,247	-	2,226
Mariposa Grove	3,268	3,268	-	3,268	1,885	753
Total A-1	18,962	18,962	-	16,378	7,734	5,559
Priority A-2	1,872	1,872	-	1,157	-	-
Total Priority A-1 & A-2	20,834	20,834	-	17,535	7,734	5,559
Priority A-3	54,369	40,875	13,494	21,103	8,618	19,534
Total Priority A Sugar Pine	75,203	61,709	13,494	38,638	16,352	25,093
Sequoia-Kings Canyon National Parks						
Giant Forest Unit	19,100	17,609	1,491	12,315	-	2,717
Grant Grove Unit	5,467	5,467	-	3,264	872	1,687
Redwood Mountain Unit	7,100	3,505	3,595	-	-	-
Total	31,667	26,581	5,086	15,579	872	4,404
Lassen Volcanic National Park						
All Units	11,196	11,196	-	2,166	-	2,000
Crater Lake National Park						
Cloud Cap Unit	3,632	3,632	-	1,145	416	-
All National Parks						
All Areas	121,698	103,118	18,580	57,528	17,640	31,497

*Includes acres "checked and meeting control standards without work".

TABLE 4

THE STATUS OF RIBES ERADICATION IN THE
NATIONAL PARKS OF THE PACIFIC COAST REGION
BY PRIORITY CLASSES AS OF DECEMBER 31, 1949

National Park	Total Acres All Classes	Class A (Acres)					Class B (Acres)					Class C Acres	
		Total	Un- worked	In- itally Worked	Reeradication*		Un- worked	In- itally Worked	Reeradication* 2nd Working	Other Workings	Total	Total	Un- worked
					Working	Other Workings							
Yosemite	101,506	75,203	13,494	61,709	38,638	16,352	26,303	23,417	2,886	2,308	320	-	-
Sequoia-													
Kings Canyon	112,467	31,667	5,086	26,581	15,579	872	36,200	36,200	-	-	-	44,600	44,600
Lassen													
Volcanic	17,565	11,196	-	11,196	2,166	-	6,369	-	6,369	1,076	-	-	-
Crater Lake	3,782	3,632	-	3,632	1,145	416	150	150	-	-	-	-	-
Grand Totals	235,320	121,698	18,580	103,118	57,528	17,640	69,022	59,767	9,255	3,384	320	44,600	44,600

*Includes acres "checked and meeting control standards without work".

PART VI

BLISTER RUST CONTROL BY THE BUREAU OF LAND MANAGEMENT

Financial Project BLR-6

By

Homer R. Bryan, Agent

ADMINISTRATION

Protection of selected stands of white and sugar pine from damage by white pine blister rust is the purpose of this project. These white pine stands are located principally on lands managed by the Bureau of Land Management, U. S. Department of the Interior, and lie within or closely adjacent to the Siskiyou National Forest.

The Bureau of Land Management and the Bureau of Entomology and Plant Quarantine continued to cooperate in conducting this project. A memorandum of understanding delineating the responsibilities of each agency and initiated in 1945 was continued in force during 1949. Generally, the Bureau of Land Management is responsible for all administration and the Bureau of Entomology and Plant Quarantine for technical direction, coordination, and leadership.

The Bureau of Land Management's Division of Timber Management is responsible for the selection of Oregon and California Revested Lands under its jurisdiction on which blister rust is to be controlled. Selection is based on a formula which considers present and future tree-crop values, forest management plans, and the cost of control work.

A Bureau of Land Management project supervisor administered all control work except checking which was supervised and administered by the Bureau of Entomology and Plant Quarantine.

An administrative headquarters and a warehouse for service of supplies and equipment for camps were maintained by the Bureau of Land Management at Medford, Oregon.

ACCOMPLISHMENTS

The three year program, organized and put into effect in 1947, was completed in 1949 ahead of schedule. This program called for (a) reeradication work over all previously worked areas within or adjacent to the Siskiyou National Forest, and (b) a limited amount of initial work. Portions of nine sections in the Pickett Creek and East Galice control units were worked by contract, and this completed the initial and reeradication coverage in these units. In the West Galice control unit one 20 man blister-rust-control camp completed treatment on 29 sections; 6 additional sections were worked by contract. All remaining sections in

this unit that have been selected by the Bureau of Land Management for blister-rust-control work have been checked and contracts have been awarded for the required work to be completed in 1950.

	<u>Acres Worked</u>	<u>Man Days</u>	<u>Ribes Destroyed</u>
Contract	1,688	785	11,837
Camp	1,861	985	33,402

An additional 18,885 acres scheduled for treatment in 1949 were found to be sufficiently free of ribes and were therefore not worked by eradication crews.

An average of seven checkers was employed in 1949. A systematic check was made of 17,695 acres, which includes 10,640 acres of advance check, 3,048 acres of post check, and 4,007 acres of regular check on current eradication work. Effective checking in this area presents numerous problems. The area is difficult of access and the terrain is extremely rugged. Increased utilization of contract eradication and the limited adoption of the "local control" concept of blister rust control have resulted in numerous small blocks widely spaced over several control units. The logistics involved in maintaining efficient checking production are readily apparent.

The comprehensive appraisal of areas tentatively selected for blister rust control was continued by the Bureau of Land Management during 1949. A five man reconnaissance crew sampled pine on 59,340 acres in the Trappers Cabin area.

RECOMMENDATIONS

1. Increase the emphasis on the contract procedure of ribes eradication. This should result in a lowered eradication cost. Contracting also lends greater flexibility to the project--a requirement that is of primary importance as an increasing proportion of the Bureau of Land Management control units approach a maintenance condition.
2. Decision on whether or not control work should be expanded to any additional areas should be made promptly due to the general status of rust development in southern Oregon.
3. A disease survey in conjunction with a ribes count is needed on the Trappers Cabin unit. Blister rust has been established there for more than 10 years and has caused severe damage in localized spots favorable to its spread and intensification. No disease survey data are available, and information on the extensiveness and severity of rust damage is needed to aid in the determination of what areas should receive control treatment and where protection boundaries should be located.

TABLE 1
SUMMARY OF RIBES ERADICATION BY THE BUREAU OF LAND MANAGEMENT - 1949

Control Operation	Acres		Man Days		Ribes Eradicated	Per Worked Acre	Ownership of Acres Covered						
	Worked	Checked and Meeting Standards Without Work	Total	Eradication			Checking	Total	Federal				
									National Forest	BLM	Total		
												Ribes	Man Days
Initial Work													
Siskiyou	1,195	6,253	7,448	580	157	737	21,794	0.49	18	2,926	3,565	6,491	957
Reeradication													
Siskiyou	2,354	12,632	14,986	938	95	1,033	11,608	0.40	5	6,925	8,061	14,986	-
All Workings													
Total	3,549	18,885	22,434	1,518	252	1,770	33,402	0.43	9	9,851	11,626	21,477	957

TABLE 2

SUMMARY OF RIBES ERADICATION BY THE BUREAU OF LAND MANAGEMENT 1940-1949

Control Operation	Acres	Man Days	Ribes Eradicated	Ownership of Acres Covered			
				Federal			Private
				National Forest	BLM	Total	
Initial Work							
Rogue River N.F.	5,544	4,276	301,868	-	2,344	2,344	3,200
Siskiyou N.F.	39,972	9,806	592,716	12,737	18,549	31,286	8,686
Siuslaw N.F. (Nursery Sanitation)	150	273	8,339	-	110	110	40
Totals	45,666	14,355	902,923	12,737	21,003	33,740	11,926
Reeradication							
Siskiyou	31,055	10,314	329,131	9,220	14,283	23,503	7,552
all Workings							
Rogue River N.F.	5,544	4,276	301,868	-	2,344	2,344	3,200
Siskiyou N.F.	71,027	20,120	921,847	21,957	32,832	54,789	16,238
Siuslaw N.F. (Nursery Sanitation)	150	273	8,339	-	110	110	40
Totals	76,721	24,669	1,232,054	21,957	35,286	57,243	19,478

PART VII

DEVELOPMENT AND IMPROVEMENT OF CONTROL METHODS IN THE PACIFIC COAST REGION FOR 1949

By

C. R. Quick, Forest Ecologist; W. S. Burrill, (Agent) Pathologist;
and H. R. Offord, Pathologist

SECTION 1. HIGHLIGHTS OF THE YEAR, 1949.

Ribes Ecology

The major studies of ribes ecology were continued. No changes were observed in general trends established by data of previous years. Ribes seedling establishment (persistence and growth) has been generally low for the past few years, due probably to the current "dry end" of the rain-fall cycle. Ribes on the Shaver Timber one-acre plot, Sierra N.F., were eradicated again this summer. Seedling regeneration on this plot, which was worked initially in 1939, and twice subsequent to the logging of 1941, has already slowed down a lot, presumably due to a strict control of fruiting since initial eradication and logging. Some small plots established in 1941 on the Cutler Meadow burn of 1940, from which all seedling plants were removed, still remain practically devoid of vegetation.

Experimental logging of virgin over-mature mixed-conifer forest by the California Forest and Range Experiment Station on the Dodge Ridge Tract near Pinecrest, Stanislaus N.F., is progressing according to schedule. The area cut in 1948 was re-logged in 1949 according to plan, to remove temporary seed trees. The 1949-cut area was logged by slightly modified methods. Dunning's forest condition class system seems in the process of rapid acceptance. Experimental areas on other forests already have been cut according to his general principles. A series of small ecology plots, designed to study post-logging regeneration of ribes in relation to Dunning's forest condition classes, was established this summer on the Dodge Ridge Tract.

One principal objective of the Dodge Ridge experiment is to develop and test effective methods for insuring the natural regeneration of sugar pine from seed. Sugar pine "catch" on the 1948-cut area was good, but not exceptionally so. A considerable proportion of the sugar pine seed which fell on the area in the fall of 1948 was destroyed during the winter, apparently by mice. This emphasizes again the great importance and difficulty of effective control of rodents on logged areas.

The D. & I. unit was represented by Quick on the pine inventory committee of the Regional Office. Considerable time was spent in meetings, conferences and field trials, and in assisting preparation of memos and instructions. Field procedures were ready for large-scale use during the fall. Some system of calibration for the collected data, for the direct comparison of areas differing in many ways, remains to be worked out.

The control standards committee of the Regional Office also included Quick. After considerable discussion and assorted preliminary drafts, a new set of tentative control standards was prepared for 1949 use in the field.

Chemical Methods

For California and Oregon noteworthy results of 1948 tests and late-season observations from the 1949 tests on chemical methods of ribes control are as follows: (1) Improved kill of old-age class Ribes roezli at the mature fruit stage of seasonal development by using aqueous sodium salt of 2,4-D, 500 ppm containing summer oil emulsion 1% by volume; (2) improved kill of the resistant strains of R. roezli encountered on the Plumas and Lassen National Forests by using the isopropyl ester 2,4,5-T 1000 ppm plus isopropyl ester 2,4-D 500 ppm plus summer oil emulsion 1%; (3) reduction in time required to treat large erect type ribes (R. cereum, R. nevadense, and large R. roezli) and possibly increased kill of these bushes regardless of season by the basal stem treatment; this treatment makes use of a concentrate (1-10%) of the ester of 2,4-D or 2,4,5-T in an oil diluent; (4) confirmation of the effectiveness of 2,4,5-T for control of R. binominatum, R. lobbi, R. inerme, R. lacustre, and R. viscosissimum; these species cannot be killed economically with 2,4-D. Results of 2,4,5-T sprays on R. montigenum and R. tularense looked encouraging at the end of the season but final interpretation must await the 1950 check.

Practical tests of the basal stem method of treating R. cereum were made at Union Creek, Oregon, and at McCloud, California. The latter test involved the coverage of some 389 acres by a crew of four men, two of whom carried knapsack or hand sprayers for treating the ribes. The use of chemicals did not seem to reduce significantly the rate at which the area was covered by the crew. Once a large bush or clump is found there is no question about the greater speed of the basal stem treatment by comparison with grubbing. From data obtained in years past, mechanical methods (horse-drawn plow, power grapple, 'dozer, etc.) would not appear to be as efficient on large, erect bushes as the basal stem treatment with 2,4-D or 2,4,5-T. Ribes can be killed by the basal stem application of 2,4-D or 2,4,5-T concentrates in Diesel oil. It remains to be proved how effective the kill will be with economical dosages of the herbicide.

Inspection of the 1948 helicopter plots in California showed that little or no damage resulted to meadows or to well established conifers with dosages of 2,4-D (16 ounces acid per acre or less) that were potent enough to cause significant damage to ribes and associated brush. Several sugar pine and yellow pine were damaged on plots where the dosage probably exceeded 1.5 pounds of acid per acre and where oil had been used as a diluent. On the 16 plots treated by helicopter, 2 yellow pine and 5 sugar pine were killed, and 3 yellow pine and 10 sugar pine were damaged; all were trees 20 feet or less in height; all of the dead trees and most of the damage occurred on plots sprayed with the oil diluent. Seventy-five percent bush kill or better of R. roezli occurred on 5 of the helicopter plots.

SECTION 2. RECOMMENDATIONS FOR USE OF CHEMICALS IN OPERATIONS WORK FOR 1950.

[Note: These recommendations are based on data available through the end of the 1949 field season. If final results of 1949 plots necessitate changes they will be made in a special memorandum as early as possible in the 1950 field season. All ribes listed have been killed effectively (95-100% bush kill) by low dosages of 2,4-D or 2,4,5-T applied by the methods indicated on experimental plots.]

(1) RIBES SPECIES.

- A. Susceptible to 2,4-D: R. bracteosum, R. nevadense, and R. roezli.
- B. Susceptible to 2,4,5-T: R. binominatum, R. cereum, R. cruentum, R. erythrocarpum, R. lacustre, R. lobbi, R. sanguineum, and R. viscosissimum. (R. montigenum and R. tularense tentatively in the susceptible category.)

(2) TYPES OF TREATMENTS AND FORMULATIONS.

- A. Initial spray 2,4-D regular (dilute aqueous with conventional sprayers). For all species listed in (1)A above, prepare the sprays from sodium salt (90% monohydrate dry powder), amine salt (60% or more, aqueous solution), or ester (40% or more, oil and water miscible solution). The type of 2,4-D product is optional for use as dilute aqueous sprays in early season work on R. roezli from the Eldorado N.F. south through Sequoia N.P. In these areas use 500 ppm for mixed populations of R. roezli and R. nevadense. For nearly pure stands of R. nevadense use 1000 ppm. For late season work, i.e., after fruits are nearly full size and have started to turn yellow, eliminate Titanox-Tergitol and add to the 500 ppm 2,4-D aqueous solution 1% by volume summer oil emulsion and 0.04% sticker-spreader (1 gal. summer oil and 5 fluid ounces du Pont sticker-spreader for each 100 gals. spray solution).
- B. Initial spray mixed 2,4-D and 2,4,5-T (dilute aqueous with conventional sprayers). For R. roezli growing on the Plumas and Lassen National Forests, use the following formulation: 500 ppm ester or NH_4 salt plus 1000 ppm ester of 2,4,5-T plus 1% (by vol.) summer oil emulsion.

With formulations (2)A and (2)B cover thoroughly all leaves, stem tips, and stems to ground line. Wet ground about all root centers to insure coverage of all adventitious buds, basal stem, and layering stem, and about the crown, especially on large old bushes. Tuddling the soil about the crown center is not necessary. Spray bushes from two opposing directions. Use Titanox B-30 as marker, and Tergitol 7 as spreader, or 1% by volume light medium summer oil emulsion, plus the sticker-spreader, according to instructions in Spray Manual.

- C. Initial spray 2,4,5-T (dilute aqueous with conventional sprayers). For all species listed in (1)B above, prepare the sprays from the 2,4,5-T ester (40% or more, oil and water miscible solution). Use 2500 ppm and apply as described for 2,4-D above. Use marker and spreader as needed and as equipment permits, according to directions given for 2,4-D, using the summer oil emulsion in place of Titanox whenever practicable.
- D. Initial spray (concentrates with Hi-Fog gun or other low volume sprayers). Use 2,4-D, 2,4,5-T, or mixture of 2,4-D and 2,4,5-T, depending on species of ribes, and 1% ester solution with water or oil as diluent or 1% amine with water diluent in Hi-Fog gun, or in knapsack sprayer equipped with atomizing nozzle. Use 5% light medium summer oil emulsion with aqueous ester formulation as a marker.
- E. Respray (dilute aqueous with conventional sprayers). Use ester of 2,4-D, 2,4,5-T, or mixture of 2,4-D and 2,4,5-T in dilute water solution, depending on species of ribes. The amine and sodium salt of 2,4-D are optional for work on R. roezli and R. nevadense. Use 500 ppm 2,4-D or 2500 ppm 2,4,5-T according to ribes species being treated. Use marker and spreader as needed according to Spray Manual instructions.
- F. Respray (concentrates with Hi-Fog gun, Sure Shot hand sprayer, or other low volume sprayers). Use 2,4-D, 2,4,5-T, or mixtures of 2,4-D and 2,4,5-T ester, depending on species of ribes; use a 1% ester solution with water or oil as a diluent, or 1% amine 2,4-D with water diluent. Summer oil emulsion (as in (2)D) in the aqueous solution will serve as a marker.
- G. Decapitation (concentrates with oil-can, Sure Shot hand sprayer, or similar dispenser). Use 2,4-D or 2,4,5-T according to ribes species. Use a 1% solution of the ester or amine salt. Commercial ester herbicide can be diluted with oil or water. Commercial amine herbicide can be diluted with water only. Cut through crown if possible, or cut off all canes as low as possible. Apply enough liquid to wet all freshly cut surface of the crown, or all cut canes, using enough liquid to give a generous run-off onto crown where it is necessary to treat short stubs of canes. Wet all adventitious buds and all exposed crown tissue.
- Ammate, if available, is a good all-purpose killer for decapitated bushes of all species. Use Ammate dry; cover all cut surfaces. Never apply Ammate to ribes growing near valuable conifers.
- H. Basal stem spray (knapsack unit with atomizing nozzle, Sure Shot, or squirt type oil can). Use a 5% ester solution diluted from ester of 2,4-D or 2,4,5-T according to species; dilute only with kerosene, stove oil, or Diesel oil. (Diesel oil is cheapest.) Apply as a fine spray from two or more directions to wet thoroughly lowest 12 inches of all stems. All crown and stem tissue in contact with ground should be wet by run-down from stems or by direct application. Do not economize on material. Remove duff and ground litter that screen central crown and lateral root centers with boot or scarifier attachment.

At present, confine basal stem spray to large R. cereum, R. nevadense, and R. roezli in spots easily located for rework. A second working by grubbing or chemical should be planned. Special advantage of this method is rapidity of treatment of large bushes, and the use of mobile, economical equipment. This method should be especially effective on ribes in heavy brush.

(3) WHEN TO TREAT.

- A. Initial sprays. Titanox-Tergitol formulation. Do not start spraying any ribes with either 2,4-D or 2,4,5-T until the snow has disappeared from north slopes and north coves of area to be worked. Regardless of age class or size of bushes, do not start spraying until flowers are fully open on typical bushes in the cooler spots, until leaves on 2-year-old wood or older are fully expanded and until spines are noticeable on the swelling ovary. Insofar as operations permit, start spraying at lowest elevations and(or) warmest sites. For period of high susceptibility the approximate length of the average spray season for R. roezli 10 years or older is 4 weeks; for bushes 5 to 10 years, 6 weeks; and for bushes 3 to 5 years, 10 weeks. Seedlings 1 to 2 years old can be killed effectively throughout our normal field season when bushes are in good foliage. Where R. nevadense grows as a major component of the ribes population, the effective spray season can be extended for about 2 weeks.
- B. Initial sprays. Summer oil emulsion, sticker-spreader formulations. This formulation can be used throughout the spray season extending spray work through the ripe fruit stage of R. roezli, or it may be used as a substitute for the Titanox-Tergitol spray for late season work only.
- C. Respray. It is preferable to schedule respray work for the second season following initial spray and then to keep the same seasonal schedules as you would for initial spray work. For the average year, a respray season from mid-July to mid-August should be OK provided the sprouts are growing vigorously and most of the sprouts are large enough to be found easily. Bushes sprayed late in the previous season will be late to resprout. Sprouts from bushes treated early in the previous season should appear early the following year. When administratively desirable to respray the year following initial spray, allow half the growing season to elapse before starting respray work with either 2,4-D or 2,4,5-T.

D. Decapitation. Ribes may be decapitated and treated any time during the field season. For earliest and latest work when heavy rains may be expected, the ester concentrate of 2,4-D or 2,4,5-T diluted with straight kerosene, Diesel or stove oil, will have some advantage in kill over the aqueous amine concentrate.

E. Basal stem spray. Good results have been obtained from the earliest part of the season when dilute sprays become effective in initial spray work until about the time that respray work would be terminated. In an average year the season on R. nevadense is approximately from early May to mid-August. A special memo will be issued on schedules for basal stem work about mid-July 1950.

SECTION 3. DEVELOPMENT OF NEW HERBICIDES FOR RIBES ERADICATION WORK.

Results of 1948 Field Work.

Chemical plots established in 1948 on old-age-class R. roezli, sprayed with 2,4-D when the bushes were actively growing, show an average bush kill of 84%. Data summarized include tests with concentrations from 250 to 2000 ppm of the esters, sodium salts, ammonium salts, and triethanolamine salts of 2,4-D. This percent of kill has been nearly the same for each of the past 4 years. Resprays of sprouting crowns have averaged 90% bush kill. Bush kill of R. nevadense on plot work has been 98% (tables 1 and 4). In end results there appear to be no significant differences among the various salts and other forms of 2,4-D.

Early- and late-season spray treatments have consistently given a lower bush kill than treatment during the regular spray season. Average bush kill from late season treatment of old-age R. roezli is under 40% (table 1). One exception to this low average was on plots established at Boggy Meadows, Sierra N.F., in August 1948 on some 3000 old-age R. roezli treated with sodium salt of 2,4-D plus 1% medium summer oil emulsion and 0.04% of sticker-spreader. Light, medium, and heavy treatments replicated at 250, 500, and 1000 ppm with the sodium salt of 2,4-D were applied, and better than 90% bush kill was obtained on each of 9 plots in this series. These promising results during August on old-age R. roezli from the use of summer oil and sticker-spreader in 2,4-D sprays may permit an extension of the effective spray season.

Complete coverage with dilute spray is still considered essential. Results from the 1948 Boggy Meadow plots confirm earlier data, and show that a heavy crown drench and the spraying of the foliage beyond the requirement of wetting all leaves and stems do not increase bush kill to any significant degree.

Decapitation tests continue to result in almost 100% bush kill; live bushes were found only where canes had been cut high (table 2).

A satisfactory bush kill of R. roezli and R. nevadense even on plants approaching dormancy, was obtained by spraying the basal portions of all stems with 2,4-D esters in oil, with and without scarification.

R. cereum was satisfactorily treated with esters of 2,4,5-T in oil. Five percent solutions of esters in oil gave as good a kill as 10% and 20% (table 3). Costs of such concentrated spray materials, of course, are relatively high. Units with oil-resistant fittings must be used for basal stem work when oil or oil emulsions are used.

A recheck in 1949 of plots treated in 1947 with concentrations of 2,4-D varying from 100 to 500 ppm, showed that over 50% of the bushes resprouting in 1948 were dead in 1949. This die-back was sufficient to increase the average bush kill from 83% reported in 1948 to 92%.

In Oregon, R. binominatum was killed on small experimental plots with (1) 2,4,5-T triethanolamine salt, (2) 2,4,5-T and Ammate, (3) sodium salt of 2,4,5-T and sodium pentachlorophenate, (4) 2,4,5-T acid plus tributyl phosphate in kerosene, and (5) sodium trichloroacetate. Ribes erythrocarpum was killed with (1) allyl mixed chlorophenyl carbonate in Diesel oil, (2) ammonium salt of 2,4-D plus ammonium trichloroacetate, (3) 2,4,5-T acid plus tributyl phosphate in kerosene, and (4) 2,4,5-T triethanolamine salt. R. lobbi was killed with (1) 2,4,5-T triethanolamine salt, (2) allyl mixed chlorophenyl carbonate in Diesel oil, (3) 2,4,5-T plus Ammate, (4) 2,4,5-T acid plus tributyl phosphate in kerosene, and (5) by basal stem treatment with 2,4-D butyl ester in kerosene. R. viscosissimum was killed (1) with 2,4,5-T triethanolamine plus Ammate, and (2) 2,4-D acid plus tributyl phosphate in kerosene. R. sanguineum was killed by basal stem treatment with 2,4-D butyl ester in kerosene. R. lacustre was not satisfactorily killed with 2,4,5-T, but the results are not conclusive and additional tests of 2,4,5-T on R. lacustre in Oregon are indicated.

A satisfactory kill of R. roezli was obtained on 5 of the 16 plots in the helicopter spray tests of 1948. Fourteen months after spraying by aircraft, a 10% check showed the most effective formulation to be 33.4 ounces (acid equivalent) of 2,4-D ester and 5 gallons of Diesel oil per acre. 2,4-D formulations of aqueous ammonium salt with summer oil emulsion and a sticker-spreader, and aqueous ester with a sticker-spreader were also effective. Ten gallons of oil, or of water containing 0.5% of oil emulsion, and 1.5 pounds of 2,4-D per acre seemed an effective and practical dosage for initial spraying operation. Least effective of the sprays was the aqueous amine formulation.

Chemical Tests of 1949

Further studies were made in 1949 of the effectiveness of 2,4-D, 2,4,5-T, and other new herbicides. Some 350 experimental plots were established in California and Oregon. Ribes species included in experiments were R. cereum, R. cruentum, R. inerme, R. lasianthum, R. montigenum, R. nevadense, R. roezli, and R. tularense. Basal stem treatments and other low-volume, high-concentration dosages of 2,4-D and 2,4,5-T in oil, or in water plus oil emulsion, were given special attention.

A total of 208 plots was established on the Sierra National Forest, in the Camp 5 area on Whiskey Ridge, east of North Fork. One group of tests was replicated nine times during the period from June 6 to August 16. Another series was replicated four times during the summer.

New formulations and new methods of application were designed to test the effectiveness of treatment of over-mature R. roezli and of R. roezli growing in dense brush.

Seventy-three plots were established on the Plumas National Forest. A series of 2,4-D and 2,4,5-T formulations was replicated three times on R. roezli growing on rocky sites along the old Davis logging road. Three plots, to test combinations of 2,4-D and 2,4,5-T of special interest in the treatment of the spray-resistant bushes (those difficult to kill with dilute aqueous 2,4-D), were established by the spray crew at Walter's Mine camp.

In October, 41 plots were established with knapsack-type sprayers on Park Creek and at Tuman's Mill, Eldorado N.F. The plots were designed to test the effectiveness of late season basal stem and dormant-spray treatments on R. roezli and R. nevadense with concentrated formulations of 2,4-D and 2,4,5-T.

The toxicity of the esters of 2,4-D and 2,4,5-T to R. cereum, R. lasianthum, R. montigenum, and R. tularense was studied on 22 plots established during the summer on Sequoia N.P., Stanislaus National Forest, and Rogue River N.F. Each of these species presents a difficult eradication problem.

A practical application of the basal stem treatment was made on 8 plots August 1-4, at the Mt. Shasta Nursery. Ribes, mostly large R. cereum, on 389 acres were treated in 104 man-hours with 42 gallons of 2,4-D and 2,4,5-T esters in oil. For the major part of the job back-pack units were used. The Sure Shot hand sprayer was convenient when its use was restricted to an occasional bush, but its small size (1 quart) was inadequate for spraying dense populations. The hand air-pump was too slow for re-charging the Sure Shot; CO₂ cartridge recharging was satisfactory. The Hi-Fog unit was considered good; it was handy for a high-pressure, fog-like spray, but its capacity is inadequate in dense patches of ribes. The trombone pump with back-pack tank was effective for basal stem work, but waste of material from leaks was greater than from the other units. The Hudson Du-More pump was generally best liked. It was considered effective for large-scale basal-stem work and is light and relatively cheap. A low volume nozzle is desirable for all basal stem work.

Table 1. Results of 1947 and 1948 spray tests of 2,4-D and 2,4,5-T on Ribes roezli and R. nevadense in Calif.

Plant growth	Bush age	Concentration ppm or percent	Dilu- ent	No. of tests	No. of bushes Sprayed	Killed	Bush kill
2,4-D on Ribes roezli - Initial spray							
Commencing	Old	250-2000 ppm	Water	8	153	61	37.4
		20%	Water	1	11	9	81.8
		1-20%	Oil	7	115	24	20.9
Active	Old	250-2000 ppm	Water	19	235	197	83.8
		1-20%	Water	11	76	66	86.8
		1-10%	Oil	3	11	11	100.0
	5-10 yrs.	240-2000 ppm	Water	22	357	332	93.0
		1-20%	Oil	10	455	365	80.2
Past active	Old	250-2000 ppm	Water	13	104	41	39.4
		1/2-10%	Water	8	80	60	75.0
		1-20%	Oil	5	68	48	70.6
	5-10 yrs.	1000 ppm	Water	3	40	26	65.0
		1-10%	Water	3	439	355	80.9
2,4-D on Ribes roezli - Respray only							
Active	Old	1/2, 5%	Water	2	30	28	93.3
	5-10 yrs.	250-2000 ppm	Water	7	116	104	89.7
		1/2-20%	Water	21	1112	987	88.8
		1-20%	Oil	4	250	244	97.6
Past active	Old	2%	Oil	1	62	46	74.2
2,4-D on Ribes nevadense - Initial only							
Commencing	Old	5%	Water	1	13	4	30.8
		20%	Oil	1	14	7	50.0
Active	Old	250-2000 ppm	Water	11	78	78	100.0
		1-20%	Water	15	239	234	97.9
		1-10%	Oil	6	39	39	100
	5-10 yrs.	250-2000 ppm	Water	11	75	75	100
		1-10%	Oil	5	103	103	100
Past active	Old	250-2000 ppm	Water	7	33	18	54.5
		1/2-10%	Water	4	14	11	78.6
		1-20%	Oil	4	13	10	76.9
2,4-D on Ribes nevadense - Respray only							
Active	5-10 yrs.	1/2-20%	Water	10	41	41	100
		1-10%	Oil	3	11	11	100
2,4,5-T on Ribes roezli - Initial only							
Active	5-10 yrs.	1000 ppm	Water	6	120	112	93.3
	Old	250-2000 ppm	Water	9	110	26	23.6
Past active	5-10 yrs.	250-2000 ppm	Water	7	121	43	35.5
2,4,5-T on Ribes roezli - Respray only							
Active	5-10 yrs.	1000 ppm	Water	3	45	25	55.5
2,4,5-T on Ribes nevadense - Initial only							
Active	5-10 yrs.	1000 ppm	Water	1	1	1	100
Past active	Old	250-2000 ppm	Water	7	59	4	6.8
2,4,5-T on Ribes nevadense - Respray only							
Active	5-10 yrs.	1000 ppm	Water	1	2	2	100

Table 2. Summary of 1947 and 1948 decapitation tests by concentrations of 2,4-D in percent bush kill

Plant growth	Dil- uent, water or oil	Year of tests	Concentrations of 2,4-D in percent							
			20%		10%		5%		1%	
			Bushes, dead over treated	Per- cent bush kill	Bushes, dead over treated	Per- cent bush kill	Bushes, dead over treated	Per- cent bush kill	Bushes, dead over treated	Per- cent bush kill

Ribes roezli

Com- menc- ing	Water	1947	8/8	100	1/1	100	2/2	100	3/3	100
		1948	-	-	1/1	100	2/2	100	4/4	100
	Oil	1947	3/3	100	-	-	-	-	-	-
		1948	-	-	1/1	100	2/2	100	3/3	100
Active	Water	1948	-	-	1/1	100	1/1	100	1/1	100
	Oil	1948	-	-	1/1	100	-	-	1/1	100
Past active	Water	1947	-	-	1/1	100	6/6	100	5/5	100
		1948	-	-	1/1	100	3/3	100	1/1	100
	Oil	1947	4/4	100	4/4	100	4/4	100	5/5	100
		1948	-	-	1/1	100	-	-	-	-

Ribes nevadense

Com- menc- ing	Water	1947	20/20	100	-	-	-	-	4/5	80
		1948	-	-	13/13	100	8/8	100	6/6	100
	Oil	1947	6/10	60	-	-	-	-	-	-
		1948	-	-	9/9	100	8/8	100	6/6	100
Active	Water	1948	-	-	4/4	100	3/3	100	4/4	100
	Oil	1948	-	-	5/5	100	4/4	100	4/4	100
Past	Water	1947	30/30	100	24/25	96	14/14	100	5/5	100
		1948	-	-	2/3	66.7	1/1	100	2/2	100
	Oil	1947	6/6	100	6/6	100	6/6	100	5/5	100
		1948	-	-	2/2	100	1/1	100	4/4	100

All sprouts are from high cuts.

Table 3. Summary of 1947 and 1948 basal stem tests of 2,4-D in oil
on Ribes roezli and R. nevadense

Plant growth	Concen- tration in percent	Percent bush kill			
		R. roezli		R. nevadense	
		1947	1948	1947	1948
Commencing	20	100	100	100	100
	10	-	100	-	100
	5	-	-	-	100
Active	20	86.2	-	100	100
	10	-	100	-	100
	5	-	-	-	100
Past active	20	58.1	100	87.2	100
	10	42.9	-	84.9	100
	5	100	-	71.4	100
	1	-	-	100	-

Table 4. Summary of 1945-1948 spray tests of 2,4-D on Ribes roezli and R. nevadense (initial spray only)

Plant growth	Bush age, years	Concentrations of 2,4-D used	Percent bush kill by year				Mean per cent kill 1946-48
			1945	1946	1947	1948	
Ribes roezli							
Commencing	Old	250-2000 ppm 20% in water 1-20% in oil	- - -	- - -	37.4 81.8 20.9	- - -	37.4 81.8 20.9
	5-10 yrs.	750 ppm	70.0	-	-	-	-
Active	Old	250-2000 ppm 1-20% in water 1-10% in oil	81.6 - -	- - -	1/ 92.4 86.2 -	80.5 90.9 100	83.8 86.8 100
	5-10 yrs.	240-2000 ppm 1-20% in oil	97.6 -	93.3 -	93.0 80.2	- -	93.2 80.2
Past active	Old	250-2000 ppm 0.5-10% in water 1-20% in oil	42.5 - -	14.7 - -	23.1 - 78.6	49.2 75.0 57.7	22.7 75.0 70.6
	5-10 yrs.	250-2000 ppm 1-10% in water	55.0 -	45.4 65.6	65.0 80.9	- -	46.4 70.2
Ribes nevadense							
Commencing	Old	5% in water 20% in oil	- -	- -	30.8 50.0	- -	30.8 50.0
	Young	500-750 ppm	75.0	-	-	-	-
Active	Old	250-2000 ppm 1-20% in water 1-10% in oil	100 - -	- - -	100 98.6 -	100 93.3 100	100 97.9 100
	Young	250-2000 ppm 1-10% in oil	- -	100 -	100 100	- -	100 100
Past active	Old	250-2000 ppm 1/2-10% in water 1-20% in oil	- - -	- - -	44.0 - 76.9	87.5 78.6 -	54.5 78.6 76.9
	Young	500-750 ppm 2-3.2% in water	92.0 -	84.2 91.5	- -	- -	84.2 91.5

1/ This figure was changed from 83.3% bush kill to 92.4 due to additional kill noted in 1949. This means that 9.1% additional bush kill took place the second year and 54.5% of the bushes sprouting in 1948 died back and were dead in 1949.

SECTION 4. RIBES ECOLOGY IN CALIFORNIA, 1949

Sugar Pine Silviculture

The California Forest Experiment Station's experimental logging area on Dodge Ridge, southeast of Pinecrest, Stanislaus N.F., was observed occasionally during the season. The operation, as it develops according to plan, continues to be most interesting. Design and general objectives of this experiment have been described by Dunning (West Coast Lumberman 76(3): 62, 64. March 1949).

Last year it was proposed that a ribes seedling-occurrence milacre be initiated on the spot from which each of 66 duff samples were collected from this area in the fall of 1947. This spring, because of extensive disturbance and displacement of top soil during and after logging operations, this proposal was abandoned. Instead, about 100 milacres for study of ribes seedlings were superimposed on selected portions of plots established by the Forest Experiment Station for a study of regeneration of coniferous and other plant species. Table 5 summarizes data collected from these sample milacres. The NE 1/4 of section 27 of the Dodge Ridge Tract has been within the BRC unit boundary for some years, but the NW 1/4 of section 26 was placed within the unit in 1947, and was given initial ribes eradication in 1948. The variations in ribes regeneration on areas within a control unit for a long or a short time, as well as variations on the various "forest condition classes" and treatments of the experimental logging area will be studied on these recently established milacres.

It is encouraging to note that experimental methods employed on the Dodge Ridge Tract already have been occasionally applied on other forests.

An interesting aspect of sugar pine regeneration turns up repeatedly on the lava flats and slopes in the northern part of the Plumas N.F. and on the Lassen N.F. There is in this area an apparent increase, or concentration of sugar pine regeneration on logged or burned areas for some years after the disturbance. That is, even 10 to 15 years after logging disturbance, sugar-pine current-season seedlings continue to appear, and to persist and grow. This continuation of effective sugar pine regeneration seldom if ever is found in the central Sierras. The lava areas to the north, although of somewhat lower average site quality, are ecologically more pioneer than many comparable areas in the central Sierras. The considerable degree of "intolerance", or "pioneerness", of sugar pine regeneration may well explain this apparent advantage on the shallowish lava soils. This matter warrants added observation, and perhaps formal plot study.

Sugar Pine Stocking Surveys

Work was continued during the year with the committee studying sugar pine stocking methods. Short reports dealing with two aspects of the stocking survey were prepared: (1) "Some ecologic aspects of the (1948) pine inventory method of control area analysis on old cut-over," dated 2/14/49, and (2) "A comparison of pine inventory data from one forty; stocked quadrat versus continuous strip," dated 8/12/49.

Logging and Ribes Eradication

The importance of maintaining a strict control over gooseberry fruiting on control areas after logging, continues increasingly evident. Two one-acre ecology plots are of special interest in this regard. Ribes eradication was so timed on the Shaver (logged) Timber plot, Sierra N.F., and on the Fanianni (logged) Timber plot, Lassen N.F., that practically no ribes fruited on them after logging. Table 6 summarizes the history of ribes populations on the Shaver plot since initiation in 1939. Table 7 similarly summarizes ribes data from the Fanianni plot since initiation in 1940. Table 8 presents an age-size distribution of the ribes removed in 1949 from the Shaver plot. This 1949 working is the second eradication of ribes since logging in 1941. Apparently the rate of ribes growth on this plot already has slowed considerably. Table 7 shows also that comparatively few new seedlings are sprouting annually on this plot. In contrast to this, data from one acre of the notorious Cow Creek seedling-occurrence plot may be of interest. On this latter one-acre plot, some 765 estimated current-season gooseberries appeared in 1949. It will be recalled that the Cow Creek plot was logged in 1925, but was given initial eradication in 1930 after the development of a large and heavily-fruited population of gooseberries.

Fire and Eradication

A number of ribes ecology plots have been established on burns. Those plots on which no ribes fruits were permitted to mature after the burn continue free of current-season gooseberry seedlings.

Ecologic conditions on the Blue Canyon one-acre plot, Sierra N.F., were radically and abruptly changed by the Bretz Mill fire of August 1947. This fire killed all aerial parts of all trees and other plants on the plot. The vigorous start of a new vegetation on the burn was indicated in July 1948 by a large number of plant seedlings and resprouts. Data from 10 selected milacres are summarized in table 9. The general area was salvage logged shortly after the plot was inspected in 1948. A logging road now crosses the plot diagonally, but the rest of the plot was little disturbed after the burn. Several small chemical-spray plots were established in July 1949 on the post-burn regrowth, if possible to define a convenient method for completely eradicating mixed seedlings of the gooseberry and other brushy plants. Previously presented data show that few or no seedlings of ceanothus and manzanita, as well as of ribes, subsequently appear on burned areas if the first crop of seedlings is removed.

Small Bush Problem

The problem of finding small ribes hidden in other vegetation, especially in dense brush, continues to be troublesome. Table 10 suggests the magnitude of this problem on four one-acre plots. The Pilot Peak plot, Sierra N.F., is a mixture of small areas of dense high bear clover, open manzanita brush, coniferous reproduction, pole-sized timber, and black oak. The Signal Peak plot, Sierra N.F., is largely covered by dense ceanothus-manzanita brush, but supports a fair amount of coniferous reproduction, and has several small open areas of dense low bear clover.

The Inter-Road plot, Plumas N.F., is open cut-over with a considerable understory of mesophytic (broad-leaved) brush. The Rock Creek plot, Plumas N.F., is open uncut timber on a dryish lava slope crossed by a wet draw. The Pilot Peak plot was worked in 1948 by the one-man block system, and the Inter-Road plot in 1949 by a contractor.

Reports in Progress

Several ecology studies have now reached a stage where reports presenting summaries and analyses of collected data would be logical. During the spring of 1949 the BRC Regional Office greatly assisted this project by preparing summaries of voluminous field data. Serial reports will be prepared as fast as time and opportunity permit. Serial Report No.132, a general summary of gooseberry ecology, prepared in 1946, has been rewritten for publication.

Table 5. Current-season ribes seedlings found on sample milacres,
Dodge Ridge Tract, 1949

Items of data	Old erad., SE 1/4 of NE 1/4, sec. 27	New erad., SE 1/4 of NE 1/4 sec. 26
Number of milacre samples counted	52	50
Milacres with 1 or more <u>R. roezli</u> seedlings	17	19
Milacres with 1 or more other ribes* seedlings	4	9
Milacres with 1 or more ribes (all sps.) seedlings	19	21
Total number <u>R. roezli</u> seedlings	52	141
Total number other ribes* seedlings	(13%) 8	(20%) 36
Total all species ribes seedlings	60	177
Mean number ribes seedlings per milacre	1.15	3.54

*Ribes cereum and R. nevadense.

Table 6. Ribes observed on Shaver Timber one-acre plot, Sierra N.F., since initiation in 1939. (Ribes eradicated in 1939, 1945, and 1949; logged 1941.)

Date of check	Total live stem, feet	Size distribution of known ribes							Total known ribes	Fruiting ribes	Age distribution of known ribes					
		0-4"	5"-11"	12"-35"	3'-5.9'	6'-11.9'	12'-24'	25'+			CSS	1	2	3	4	Older
9/6/39	7	6	5	1	-	-	-	-	12	-	-	5	1	1	2	3
6/5/40	32	394	8	6	1	2	-	-	38	1	370	24	-	-	6	11
7/11/42	20	273	4	9	-	-	-	-	286	-	252	18	2	2	3	9
8/10/43	459	562	95	61	29	12	3	1	763	-	537	205	11	1	2	7
8/5/44	1596	469	147	120	45	28	29	12	850	10	213	507	118	**	**	12
8/20/45	5723	389	149	196	99	59	43	61	*996	45	152	246	460	127	**	11
7/11/46	3	117	-	-	-	-	-	-	117	-	117	-	-	-	-	-
6/25/47	44	440	20	7	1	-	-	-	468	-	370	91	7	-	-	-
7/29/48	314	342	52	39	10	5	4	2	454	1	244	139	64	7	-	-
7/14/49	834	364	64	56	25	13	13	5	*540	11	228	108	116	74	13	1

*These ribes removed when plot was inspected.

**These data not separately recorded.

Table 7. Ribes observed on Fanianni Timber one-acre plot, Lassen N.F., since initial eradication in 1940.

(Ribes eradicated in 1940 and 1947; logged in 1942.)

Date of check	Total live stem, feet	Size distribution of known ribes							Total known ribes	Fruiting ribes	Age distribution of known ribes					
		0-4"	5-11"	12-35"	36-71"	6'-11.9'	12'-24'	25'+			CSS	1	2	3	4	Old-er
7/25/40	10	-	1	3	1	-	-	-	5	-	-	-	-	-	1	4
8/1/41	35	-	2	12	1	1	-	-	16	1	-	-	-	-	1	15
7/28/42	39	-	2	11	1	2	-	-	16	-	-	-	-	-	-	16
7/22/43*	35	10	2	7	2	1	-	-	22	-	9	-	1	-	-	12
8/28/44	74	23	4	4	2	2	2	-	37	-	21	3	-	-	1	12
7/23/45	142	140	29	19	2	-	4	-	194	2	85	93	3	-	-	13
8/13/46	230	68	21	26	9	4	5	-	133	3	4	38	74	4	-	13
8/6/47	708	48	43	34	19	11	6	7**	168	5	13	7	42	88	5	13
8/25/48	9	1	6	2	1	-	-	-	10	-	1	-	1	7	1	-
9/13/49	28	2	6	9	2	-	-	-	19	-	1	1	-	4	12	1

*Plot was logged prior to this inspection, apparently in fall of 1942.

**All observed ribes removed at this inspection.

Table 8. Size and age of ribes removed in 1949 from Shaver Timber (one-acre) plot during second eradication following logging.

Year of ribes origin	Years of age	No. of ribes	Estimated ribes live stem, feet*			CSS, percent of TLS	Mean TLS, feet
			CSS	OLS	TLS		
1949	0	228	6.3	0.0	6.3	100.0	0.03
1948	1	108	22.0	6.1	28.1	78.3	0.26
1947	2	116	197.8	126.0	323.8	61.1	2.79
1946	3	74	193.3	197.8	391.1	49.4	5.29
1945	4	13	33.6	39.4	73.0	46.0	5.62
Older	5*	1	2.5	9.0	11.5	21.7	11.50
Totals & Means		540	455.5	378.3	833.8	53.9	1.54

*CSS = current season stem, OLS = older live stem, and TLS = total live stem.

Table 9. Seedling plants observed in 1948 on (1947) Bretz Mill burn
(Blue Canyon one-acre plot), Sierra N.F.

Mil- acre	Location			Current-season seedlings removed July 31, 1948				Seedlings or resprouts of some other plant species* observed, but not removed						
	plot	1/4	Cor- ner	AM*	CI	RR	To- tals	CF	CX	GD	PA	VL	OS	Totals
I	A10	NW	NW	--	1	90	91	1	--	4	-	1	-	6
II	A10	SE	SE	--	--	612	612	-	--	38	-	-	1	39
III	A8	NE	NE	65	4	102	171	-	--	-	2	-	2	4
IV	B8	SW	SW	4	1	18	23	-	--	16	-	-	5	21
V	A7	NE	NE	--	3	31	34	-	--	--	-	-	-	--
VI	B7	SE	SE	18	4	80	102	2	5	--	-	-	1	8
VII	B6	NW	SW	82	7	178	267	-	--	5	-	3	-	8
VIII	A6	SW	SW	82	4	40	126	-	1	--	-	-	-	1
IX	B4	NW	SW	30	156	42	228	-	1	--	-	-	3	4
X	B3	SW	NW	--	1814	11	1825	-	1	--	-	-	-	1
M e a n s				28	200	120	348	0.3	0.8	6.3	0.2	0.4	1.2	9.2

*AM = sticky manzanita, CF = bear clover, CI = deerbrush, CX = Carex (species) and closely related genera, GD = gayophytum, OS = other sps. (sps. other than separately listed), PA = bracken fern, RR = gooseberry, VL = pine violet.

Table 10. Number of ribes by estimated ages (years of origin), recently found on four one-acre plots.

Est. year of plant origin	Est. age in years, 1949	Pilot Peak plot, Sierra 7/12/49	Signal Peak plot, Sierra 9/12/44*	Inter- Road plot, Plumas 9/16/49	Rock Creek plot, Plumas 9/15/49
1949	0	1	--	**--	2
1948	1	**--	--	--	--
1947	2	2	--	--	6
1946	3	--	--	**--	7
1945	4	1	--	--	1
1944	5	--	**--	--	7
1943	6	1	1	**2	4
1942	7	5	3	5	6
1941	8	4	9	9	4
1940	9	**4	10	**--	** 3
1939	10	10	**17	1	3
1938	11	4	10	1	1
1937	12	**8	** 6	1	1
1936	13	4	5	1	3
1935	14	7	9	1	4
1934	15	8	2	--	2
1933	16	5	--	--	1
1932	17	--	2	--	--
1931	18	--	1	--	***1
Total known ribes		64	75	21	56
Total LS, feet		112	190	134	180
Mean LS, feet		1.8	2.5	6.4	3.2

*No age data available from this plot since 1944.

**Double asterisks indicate eradications.

***This one bush appeared to be 20 years old.

FISCAL YEAR ALLOTMENTS FROM WHICH EXPENDITURES
WERE MADE BY THE DEVELOPMENT AND IMPROVEMENT PROJECT
DURING THE CALENDAR YEAR 1949

Federal Funds

Fiscal Year 1949

\$37,911

Fiscal Year 1950

\$32,351

Expenditures by the Development and
Improvement Project for the Calendar Year 1949

Fiscal Year 1949
1/1 to 6/30/49

\$18,744

Fiscal Year 1950
7/1 to 12/31/49

\$14,989

Total

\$33,733*

*Expenditures distribution by States

California	\$13,493
Idaho	10,120
Montana	1,687
Oregon	3,373
Washington	<u>5,060</u>
Total	\$33,733



